 (Switching to computer input)(2.3.6, page l5)

Other problems were in evidence, as can be seen in a newspaper article written by James Kilpatrick, Libraries Can Live Without Big Daddy. According to the article, President Nixon had recommended that continued Federal aid to libraries be stopped at the end of the fiscal year. This decision had been scored by Colman McCarthy, Washington Post columnist, who claimed that "Libraries are now on the endangered species list." This resulted in considerable discussion in the Washington library and information community. McCarthy applauded a decision of the American Library Association to protest on May 8th by asking libraries across the country to dim their lights by way of accusing Nixon of "dimming the lights on the public's right to know." McCarthy went on to say, "ALA speaks with precision when it says the public's right to know is at stake. After all, people go to libraries to read magazines,newspapers, and other sources of information, and Nixon's goal is nothing less than the smothering of information." Kilpatrick's reaction was "Horsefeathers!" He then went on to point out that the Federal library program had a bad case of bloat. The Rural Library Services Act of l956 started with a modest little $7.5 million program to aid in providing library facilities in communities of l0,000 population. That he thought was a good idea, but in l964 the program was extended to all public libraries under the
Library Services and Construction Act. The next year, there was further expansion in the form of Federal aid to elementary and secondary school libraries. Yet another act provided $5,000 grants for college and university libraries, swelling the total program to $l40 million a year. Kilpatrick, admitting to a strict constructionist view, wrote: "Libraries, desirable as they are, even essential as they are, are not the responsibility of the Federal government." Kilpatrick went on to say that even though he dearly loved libraries and librarians, he had to support Nixon's position to curtail funds. He concluded: "Up the lights, you librarians! You can live without Big Daddy, if you try." Kilpatrick wanted the libraries to compete for funds before local governing bodies. Librarians, on the other hand, knew that there would be hard times, if they followed Kilpatrick's dictum. The ALA (and Colman McCarthy) prevailed. There may have been some cutback of library funds, but nothing like what was advocated by Kilpatrick happened. The funding of libraries continued with the support of the Legislative Branch. The "smothering of information" was averted. Progress was still in the driver's seat.(1)
increasingly, the Office of Science and Technology began to recognize the significance of the Information Revolution and its effects on the future. Inevitably, thought was given to the role of the Executive Department and OST in the shape of things to come. Three major factors were considered. First, how to harness the new information technology to serve society; second, how to upgrade the efficiency and effectiveness of the Executive Branch; and third, to determine what actions were needed to cushion the impact that the new information technology would or could have on institutions and citizens. At the suggestion of Eric Ward, Executive Secretary, FCST, a paper was prepared advocating a series of new initiatives. (Bibliographic insert: Aines, Andrew A., OST, Memorandum to Robert Barlow, OST Executive Staff, Subject: Communications, Information-Processing and Reorganization, January 7, l969, pp 2.)
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The first suggestion called for the establishment of an ad   hoc Commission on Communication and Information Processing under the general guidance of the Director, OST. The task of this group would be to conduct surveys and studies and make recommendations for actions to components of the Executive Branch. More specifically, it would undertake a l0-year survey of emerging technologies dealing with communications and information-processing; study the growth of the so-called knowledge industry and the effect of new technologies on the conduct of science, education, management, industry, and governance both current and predictably in the future..The panel would appraise problems, obstacles, and impediments, including threats to privacy and intellectul property that are discernable or expected, and what remedial steps might be taken to avert or minimize them.
Finally, the commission would prepare an annual report 9ontaining specific recommendations for governmental action dealing with organization, responsibilities, programs and budgets. It would also make suggestions to the private sector to encourage cooperative and coordinated action on a national basis. To accomplish this goal, it was recommended that a second group be formed, a broad-based Advisory Panel to the Commission with representatives from industry, education and professional societies, as well as from the government. This group might be organized by and domiciled in the National Research Council. The third organizational entity recommended was a Panel for Intergovernmental Data-Processing Programs in the Executive Office of the President, which would be yoked to a similar group in Congress. This group would be charged with creating a joint development program that would make possible a coordinated and cooperative set of actions between the two branches of government, leading primarily to greatly improved information exchange between the two bodies and an
information-communication apparatus that would facilitate the flow of information and data. A second function would be to provide advice to the Bureau of the Budget and other Federal agencies leading to greater efficiency and effectiveness of their programs. (2)

It would be pleasurable to state that these groups or counterparts were established as a result of the suggestions, but nothing happened. I am of the belief that no action was taken by the OST front office to encourage the establishment of the panels, but I could be wrong. There is no way to assess what might have happened if action had been taken, but the oppportunity was there for the asking.

It was never entirely clear in the matter of Federal agency
STI management reviews if the responisbility was that of OST, COSATI or both. The OST information staff was inclined to the view that it was an OST responsibility and acted accordingly. While the agency STI managers did not welcome them with open arms, they did, nevertheless , cooperate with
OST when they were announced. One of the reviews, we called them stewardship reviews, was undertaken of the Air Force's STI program early in l969. The results were not encouraging,
 I found that the Air Force had delegated the program down to the Office of Aerospace Research. OAR in turn was focusing on its internal program rather than the total Air Force program. Little coordination was taking place between OAR, the other military services, and ODDR&E , despite the size of the overall Air Force STI program. There seemed to be lack of high level concern about this costly and important program. Relationships with other Air Force components involved with R&D and STI were tenuous. USAF had properly prepared a regulation based on the DOD STI directive, but there was a lack of vigor in attaining proper implementation. One tip off was the lack of appearance at the stewardship review of any USAF scientists interested in the Air Force STI program. The one positive element was the excellence of presentation, a far cry from the abortive effort the year before, but it was evident that much of the responsibility for a poor Air Force program fell on the shoulders of ODDR&E. The absence of a capable Air Force STI manager was another problem. After the presentation, there was some thought given to the desirability of asking the three military services to send a qualified STI manager to COSATI meetings. As a follow up, a discussion was held with ODDR&E's Rodney Nichols about hastening the selection of a new Director of Defense Technical Information as one action that could result in improved oversight of the Air Force STI program.

ODDR&E hesitated and no pressure was put on the Air Force.

Congressional

On another front, the informal OST-Congressional Staff "   Chowder" group was meeting and making progress. The general purpose of the effort was to bring members of OST and congressional staff, interested in modern information and communications, together. At a meeting held in January l969, signs of the value of the program were in evidence.-- (Bib. Ref. Aines, Andrew A. OST, Memorandum to Dr. Ivan Bennett, Deputy Director, OST, Subject: Scanning the Events of the Week and Comments, January l3, l969, pp 2.)

The attendance from congressional staff was encouraging, showing the depth of interest in inproved information processes in both the legislative and executive branches and hopes for improved sharing. The meeting was held in NASA where Melvin Day, Director of the NASA STI program, made an excellent presentation covering both the STI communication and technology utilization areas, topping his presentation off with a short film describing NASA's accomplishments in the technology utilization field. Aines followed Day's talk with a review of what was happening in international STI matters, progress in research project reporting, advances in micromedia applications, the expected arrival of Dr. Lee DuBridge, the incoming Science Advisor. the promise of information satellites, necessary and growing interest in information resources management, the need for updating the knowledge and skills of scientists and engineers in modern information handling, which incldued the reduction of the potential communications gap between generations of scientists and engineers. In turn , congressional visitors revealed that a number of bills had been introduced to improve congressional information processing capabilities. It was further agreed that Aines would act as moderator of the group and that at the next meeting there would be an open discussion of the merits of Marshall McLuhan's newest book, War and Peace in the Global Village. All participants expressed their pleasure and thanked OST for its effort to improve interdepartmental communication and elevating the information handling capabilities of Federal officers and other workers. To the best of my knowledge, except for this series of meetings, undertaken long in the past, no serious effort, formal and informal, was ever taken again between the leaders of science and technology in the two major branches of government.

International

On the international front, a few matters received attention early in January l968, when several representatives of the Department of State met with OST to discuss the COSATI-prepared, FCST-approved policy paper concerning international release of scientific and technical information reports resulting from Federal R&D. Although the State Department was not much of a factor in this area, i.e., it had taken a rather passive view in preparing international STI policy documents up to

this point, it was agonizing about getting itself positioned to enter the field more aggressively. In this instance, it wanted to put more responsibility on the Federal agencies, especially when it involved initiatives dealing with countries behind the Iron Curtain. I argued against any action that would affect the sense of the interagency agreement that had been hammered out by the FCST, but urged the Department of State to become much more deeply involved in the subject. One troublesome area that called for the help of the Department of State involved translations of foreign documents. This was the conclusion of the COSATI International Panel, relating to the need of an overall policy on translations of foreign documents. Foreseen was the need for a program to reduce the gaps and overlaps as we moved more rapidly towards mechanized information systems and mechanical translations. The Panel felt that there would be significant economies if we could get an independent group inside or outside of the government to think through the problem and come up with the best approach. The difficult problem for the Department of State was to get high enough priority on the subject that would result in a positive program. Apparently, State Department leaders found that becoming involved in scientific and technnological areas was extremely difficult with its limited staff and other resources. Hence a low priority was a certainty for scientific and technical information matters.

OECD matters also continued to receive the attention of OST and the Federal agencies.   Arrangements were made to send Dr. Lewis Branscomb to OECD as the United States expert to discuss science, communication and information issues. OECD had also sent OST a long questionnaire designed to learn more about the compatability of computer systems within the U.S. government and learned societies in the United States engaged in science communications. The information was gathered and submitted. As expected, it revealed that compatability was not even close to a reality in the U.S. or, as the survey revealed, in any other country in OECD.

(Bibliographic note: Kilpatrick, James K., LIBRARIES CAN LIVE WITHOUT BIG DADDY, Washington Post, May l5, l970, (Op ed page))

Early in January l969, there was a faint stirring about the need for some kind of an Executive Department reorganization to harness modern information and communications technology to attain progress to raise the level of efficiency and effectiveness of the Federal government.

NOTE: The next item will be footnoted as following:
Aines, Andrew A., OST, Memoranum for Robert Barlow, OST Executive Officer, Subject: Communications, Information-Processing and Reorganization,
January 7, l969, pp 2. (This bib. note belongs on page
      2, above.) RESUME TEXT.

In early January l969, the front office asked the staff to make recommendations about changes in Executive Department organization. I sent a memorandum to Bob Barlow, pointing out the need to re-organize the Executive department to harness better the new information technology that was rapidly sweeping the country. This should be done, it was pointed out, to improve the Federal use of new technology, advance the national capability in the use of the new technology, and to take steps to cushion the country against the adverse effects of the technology. A number of recommendations were made top achieve these goals.

Increasingly, the role of information was being recognized in the halls of Congress. On January l3, l969,   Representative Arnold Olsen of Montana inserted an article in the Congressional record with the provocative title,
Doesn't Anyone Work for the President? Olson points out that when it comes to information each Federal agency plays its own game, especially as they vie for larger appropriations. Usually, when the President gets information from an agency, it bears on one issue or problem - its budget in relationship to its function. The information system never talks back on the President's behalf. When things go wrong in an agency, the President usually gets the word from the press. Agencies in total issue (in l969) about three million pages a year in directives. Olsen asks how much of this information gets to the President and how useful is it in helping him do his job? There is simply not enough staff in the Executive Office of the President to screen the mountain of information prepared by the agencies so that the President can really know what is going on. Adding to the size of the staff is not the answer either, Olsen observed. He then referred to an article written by Chester l. Guthrie, National Archives and Records Service, and Thomas R. Kennedy, a staff person in the House of Representatives, whose subject was Informing the Nation`s President.   This article was also printed in the Congressional Record of the same date. The authors called for a modern information system for the President alone, using computers for the purpose. The system would be engineered to provide him with requisite information that would reveal the true picture of what was happening in the Federal establishment. The authors properly recognized that it would be a formidable task to engineer a computerized information system that would provide the President with the information that he needed, but reliance on the

imperfect system that prevailed was even less desirable. The article is valuable because of its examples which show that a number of presidential decisions were made in the earlier years that reflected the lack of good or timely information, thus resulting in less than optimum decisions. In recent administrations, concrete steps were made to strengthen the information systems of the Executive Office of the President, but there is little evidence that the President has gained directly, although it could be claimed that he has gained because the Executive Office of the President has been computerized. The problem still remains, however, that of selecting presidential candidates who are computer
-sophisticated or encouraging them to be trained on the job.
Until this happens, only little progress can take place.

One of the last acts of Dr. Donald F. Hornig involving information was evidenced in correspondence with Preston C. Hammer, head of the Computer Science Department, College of Science, Pennsylvania State University. Dr. Hammer wrote to a number of his colleagues on October l0, l968:
The absence of standards of nomenclature and symbolism
in mathematical sciences is serving to promote confusion, making communication and education unreasonably difficult...I suggest that various organizations with particular interests in mathematical literature seek ways and means of establishing and   maintaining a standards organization...Periodic   issuance of standards could, in a short while, make a   great difference in the readability of mathematical
        literature , and also make the printing of mathematics   and its instruction easier..."

l Hammer, Preston C., Head, Computer Science Department, College of Science, Pennsylvania State University, University Park, PA., Letter to l8 colleagues, dated October l0, l968, l page.

Dr. Hammer enclosed this letter in a second one to Dr. Donald Hornig, writing:
In view of the interest you are said to have evinced in information retrieval systems,I take occasion to
        send along a copy of a letter I recently distributed.   It is my impression that a far greater effort is being
        expended on making information available than there is   in organizing the information for ease of retrieval
                and   understanding...Much money and time is spent to   +   generate information on a technical level, no   commensurate portion of energy is spent to organize it   so that stored ionformation is best fit to retrieve.
                                2 Hammer, Preston C., Pennsylvania State University, Letter to Dr. Donald F. Hornig, Director, OST, November 8, l968, pp 2, plus attachments. (The first attachment is Hammer's letter to his colleagues. See footnote 3 for the second attachment.
3 May, Kenneth O., Professor of Mathematics, University of Toronto, letter to Prof. Preston C. Hammer, Pennsylvania State University, dated November l, l868, pp 2.

In his letter to Professor Hammer, May wrote:
     "I quite agree with your description of the evils of our mathematical Tower of Babel. It would indeed be fine if we could establish something like the French Academy, which could concern itself with the mathematical vocabulary as the Academy does with the French language. However, past experience seems to show that decisions by organizations on matters of terminology and notation do not in themselves have the desired result. Indeed, the success of the French Academy is due not merely to its decisions but to the fact that these are embodied in dictionaries and in the educational system." 3

Dr. May then disclosed that he was working on a comprehensive mathematical dictionary under contract with McGraw Hill. His views did not coincide with Hammer's assertion that Professor May "is pessimistic and feels that global language control is the objective." May's   assertion that he was working with a private publisher seems to neutralize Hammer's contention.

Dr. Hornig disregarded the confusion that was evident and wrote a letter to Professor Hammer, pointing out that the problem experienced by the mathematicians was reminiscent of similar problems of other groups of scientists and engineers in other disciplines. He then explained the thrust of the PSAC Report (l963) to the President, Science, Government and Information, which advised the technical sector outside of the government, as well as the government counterpart, to take a number of steps that would, in effect, help solve the problem posed by Hammer. Hornig made it clear that the private sector had the major responsibility and that the government could only help. 4
Bib. Ref. (4) Hornig, Donald F, Director, OST, Letter to Professor Preston C. Hammer, Pennsylvania State University, December 4, l968, pp 2.
It is conjectured that this was probably the last letter of its kind written by a Presidential Science Advisor to a member of academia. There may have been a more recent counterpart responding to an inquiry on over-classification of Federal STI,

for example, protest letters from university professors, but such information is not being made public.

The point to be remembered is that during the l960s, it was common for non-governmental scientists and engineers to interact with the Federal government on STI matters, a far cry from what it is today. Again, the one exception deals with over-classification of technical reports.

Having mentioned the imminent departure of the Science Advisor, several articles appeared in scientific journals about the legacy of Donald F. Hornig. One of the most perceptive of these articles was one written by Phil Boffey. (5) Boffey, Philip M., SCIENCE, Subject: The Hornig Years: Did LBJ Neglect His Science Advisor?, SCIENCE, January 31, 1969, p. 453 to 458.

Boffey acknowledges that Hornig contributed to many important things during his five years as the President's Science Advisor, but he had little control over the conditions created by the Viet Nam war, the growing public and congressional skepticism about the large R&D budget, and the complicated, cantankerous personality of President Johnson. It should be remembered that Hornig had been recruited by President John Kennedy earlier and after Kennedy's death, President Johnson went along with the choice. However, Hornig never was able to achieve the closeness with Johnson that the Science Advisors under Eisenhower and Kennedy enjoyed. Additionally, when academic scientists and members of PSAC publicly disagreed with the

President's policies involving Viet Nam and scientific de-cisions, Johnson became disenchanted with science and scientists and "took it out" on Hornig and the National Science Foundation. From the standpoint of scientists generally, Hornig was blamed because he did not obtain the kind of R&D funding level that they would have liked. William Carey, BOB, and James Shannon, NIH, were of the   opinion that Hornig failed to develop a post-Vietnam plan for Federal science and technology, and this was the basis for Hornig's problems with President Johnson. Other critics believed that Hornig's trouble had something to do with the failure of the science apparatus to contribute much to the winning of the Viet Nam war.

DuBridge, always fair and courtly, reacted vigorously to the criticism of Hornig by means of a letter to the editor of SCIENCE (February 21. l969. DuBridge found the Boffey article inadequate, unfair, and distorted what Hornig had done. DuBridge stated that he was tremendously impressed with the wide range of activities undertaken by Hornig and PSAC and with Hornig's keen insight.3

There may have been some truth to Boffey's criticisms, but from an insider's standpoint, it was evident that Hornig was a highly competent scientist-manager, who worked diligently to discharge his duties against all kinds of odds, in spite of a lack of power to direct the R&D machinery of the Federal government, especially that part that had to do with the military. He has not been given sufficient credit for the depth of his understanding of the raging information explosion and information revolution.

Within OST, there was an increasing appreciation for the need of superior information systems. Having shown its interest in an array of national information systems for science and technology, OST and COSATI blazed the trail for others who saw the need for pioneering in this area. One example within OST involved the possible establishment of an environmental quality information system. In an internal memorandum, Aines wrote to John Buckley, the OST staffer concerned with environmental quality: (5)

(5) Aines, A. Andrew, OST, Memorandum to Dr. John Buckley, OST, Subject: Environmental Qality and Information, January 29, l969, one page.

"Your information problem parallels that of the Marine   council under Dr. Edward Wenk, who, working with our office, is now studying all information facets involved in the marine science area. This is being done by the Systems Development Corporation, which has been making the study for

over a year. It is parallel because of the wide variety of disciplines, missions, data banks, agencies and non-government groups involved. Ed Wenk was able to get about $600,000 for the study, but it is my belief that you would do as well with a scaled down information system study. But at even this point, it would be safe to advocate the formation of an Environmental Quality Information Center that could operate under your policy direction. The direct operations could be under one of the established agencies, one example being the Public Health Service, which has a   couple of information centers operating in the pollution area..."

Buckley deferred action apparently because of the growth of Environmental Protection Agency's information program. There was a feeling on my part that such a study would have been a good investment because it would have laid out the parameters and the plans for a well organized environmental protection information program that encompassed EPA and the other Federal agencies, which also had environmental programs.

The OST information staff during the early part of l969 was made up of Steve Rossmassler, Robert Landau and Andrew Aines. There were many discussions internally involving the staff, which recognized that there was a need for more pro-gress in using new technology, improving the Federal STI systems, and getting stronger support from the leaders of OST,

BOB, Congress, and hopefully the President. An example of one such discussion is presented to illustrate the kind of topics that were mulled over by the staff.(6)

(6) Aines, Andrew A., OST, Internal memorandum of staff meeting involving Aines, Rossmassler and Landau, January 30, l969, pp l2

The initial part of the meeting was prefaced by Aines with an observation that the STI program would be advanced if there was some way to get the deeper involvement of the Science Advisor and possibly the President. In this connection, we should remember that former presidents have made statements concerning STI in the past, even though the technology was much more primitive and information matters were somewhat less sophisticated than those experienced today. Pulling together many of the presidential statements to display their content and the interests of the days that precipitated them would be one way to interest the incumbent to add his own thoughts to the presidential STI annals. Since it might be possible to prepare a prospectus accenting

economic, social and political factors, as well as the more traditional science and technology values, there is a fair chance that the level of attention of the President might be raised. Rossmassler pointed out that the probability of a successful venture might be greater if such a campaign could be yoked to some international event, like an unexpected nuclear explosion in a far away country, which could be viewed via satellites by the world's people. His point was that an enhancer would provide salt and pepper to the campaign. Granting that the logic was sound, Aines suggested that there should be an avoidance of anything that smacked of propaganda, if it could be avoided; there was plenty of drama in the birth and growth of the great networks for knowledge, the population of expanding scientific and technical information banks, and the infinite number of ways to apply new technical knowledge. The explosion of data programs in all field of science and technology as revealed in the data census of Science Communications, Inc. for the National Systems Task Force is a dramatic finding in itself, one that really has never been publicized. Moreover, the leadership of the United States in this field could convince the President that a statement about these and future developments would be desirable. He might also find it useful to worry about the impending gap between the United States and other countries and the need for all countries to seek growth in information and communication systems development. In his statement to the world,not only would he be voicing his concerns about uneven growth, he could also be singing the virtues of government information programs, MEDLARS as an example, but also how systems were being developed in chemistry, in physics, in engineering and other fields, some of these with the help of the Federal government. If the President finds this a desirable package, he might offer American help to other countries to assist them in making progress. Should he be attracted to the proposal, we might take the next step -- tieing the need for a new and international program to his Networks for Knowledge proposal. If we push the thought, it would be wise to provide him with a set of specific international programs that the United States could and would support. Politically, it is always expedient to prepare a plan of appropriate next steps before undertaking a new program. If he wants other countries to take specific steps, he has to tell them what the steps are. He also has to motivate them to cooperate and/or compete.

Rossmassler made two points. First, There were sufficient developments going on in the United States to give the President more than a one-shot opportunity. For example, he could tell a worldwide audience about the value of modern information systems to the individual. It was now possible for local television broadcasters to show the public radar sweeps from a local weather look-out, so they would know what kind of weather to expect over the weekend for boating and other recreational pursuits. Surely, the people of the world would find this interesting. The second point, Rossmassler continued, deals with the need to explain the time-value of information to the people. Some information can be transmitted in books and other ink-print representations to be read leisurely. Other information needs to be made available rapidly to do any good. Here is where electronic systems will play an important role. But people should recognize - up front - that there will be a different tariff for the two kinds of information.

Aines proceeded to make another point; this was the possibility that the President could be induced to make periodic statements about new problems that were being created or magnified by modern information and communications technology and processes. For example, recently a few Canadian scientists attended an international meeting in Vienna, where they complained that the United States and the Soviet Union were deriving large masses of technical and commercial data by means of satellite surveillance that they were not sharing with countries being overflown. The President might want to address this kind of a problem and tell the world what steps he is taking to share this knowledge, and what actions other countries should take to prepare themselves to receive and use knowledge generated elsewhere, knowledge that could only be obtained if they were part of the modern information-handlers club. There would be great value if there was some way to organize a government group to monitor new international developments and their impacts in the Federal government, an alert and fast-reacting group that would also be equipped to make recommendations for rapid actions. Rossmassler interjected the thought that unless we internationalized the effort, he could see the Soviets jamming broadcasts of this nature if their interests were not considered. Would the Soviets jam a science information broadcast, even if it was not propagandistic in nature?

Aines agreed that there were no easy answers about what the Soviets would or would not do, but the thought was worth exploring in an international conference on the subject, but before such a gathering was contemplated, we would be wise to think about a White House Conference or some other internal meeting or workshop on the subject. There is considerable

virtue in planting seeds before thinking about harvesting trees. Landau suggested that it might be valuable to consider using consultants to think about the proposition. There are now over 200 of these on the rolls. This observation precipitated a discussion about which of these consultants would have the kind of knowledge and background to make a useful contribution. The meeting concluded with a request to all participants to propose the names of individuals who might be brought together to discuss what next steps were needed.

Although this proposal was discussed with senior OST officials, it did not get off the ground. As President Johnson and Donald Hornig left the scene, it was evident that it was going to be harder and harder to find champions and supporters of ideas of this kind. This was true, even if more and more people were drawn into the Information Society with the passage of time. But there was a glorious opportunity back in the late l960s to take a more aggressive, seemingly semi-nationalistic, approach, although we saw it then as an action that would help the world move more resolutely into the information age. Perhaps it will happen yet.

NOTE THE NEXT ITEM DEALS WITH THE FINAL REPORT OF PEAT, MARWICK, LIVINGSTON AND CO.

(8) Rosenberg, Leon J., Dahl, Jack I., Schmidt, Leonard L.,
   Peat, Marwick, Livingston and Co., Washington, D.C., Government-Wide Research and Development Reporting, 2 Volumes I and II, (Vol. I: Analysis and Recommendations; Vol.II, Reference Data and Reviews of Major Federal Agencies), Prepared for the Office of Science and Technology Under Contract NSF C-563, January 3l, l969,

There were several reasons for the need to improve the overall Federal project-reporting system during this period. First, there was a continuing concern being expressed in congressional circles that the Federal R&D program was rife with overlap and duplication of research projects and studies. Indeed, many instances of this practice emerged, an embarrassment that was well-publicized by critics in and out of the media. Second, during this period of Federal R&D expansion, program managers were much more concerned with doing research then accounting for what they considered the minutiae of their endeavors. In those days, scientists and engineers were very mobile, moving in and out of the government from industry and academia every two or three years. They prided themselves in maintaining knowledge of ongoing research through their networks of colleagues in the area of their expertise. They were comfortable with the tradition of the "invisible college" and its oral transmission of STI. It was difficult to get them to accept formal, inkprint methods to interchange information. The establishment of the Federal Council for Science and Technology with its many panels, committees and subcommittes, COSATI and its subgroups was among them, provided the R&D managers with an organized way to maintain contact with their colleagues in the other agencies.   However, these efforts were confined to priority R&D areas,
hence did not cover more than a fraction of the approximately 50,000 or more new projects that came onto the Federal R&D books annually. The existence of the Smithsonian Science Information Exchange, whose function it was to gather data about ongoing Federal research and make these available to the Federal agencies and other users, tended to ease the problem insofar as it was a visible facility that had responsibility for the function. In truth, SSIE was only marginally successful. The only R&D community that expressed its support for SSIE was the biological R&D sector, which had been the original sponsor of the facility during its earlier years. The others, especially DOD, NASA, AEC, and others not too deeply involved in the life sciences, were much less interested, often complaining that the coverage of SSIE was inferior, even though they themselves were partially responsible because of their failure to input their data to SSIE in a timely fashion. Third, each of the agencies had devised an internal R&D project-reporting system during the years, and, for the most part, were satisfied with them, although they were individualistic and not designed for interchange purposes with other agencies and outside R&D groups. On the other hand, the SSIE work unit documentation called for a yet different format that required, insofar as the agencies were concerned, additional and time-consuming effort without commensurate return to the contributing agency.   Sensitive to the problem, the SSIE leadership, which was receiving
 the reluctant financial support of the National Science Foundation, was prone to " run" to friends in Congress to complain about the "burden" of NSF management oversight and the lack of willingness of the Federal R&D agencies to both submit all of their ongoing project data and to use the services provided by that agency. On occasion, congressional committees in science and technology took actions to convince the Federal agencies to cooperate with SSIE and Smithsonian Institution authorities.

As these gyrations were taking place, it was decided at OST that new steps were needed to rationalize the government-wide project- reporting system of which SSIE was a part. The resulting action was a decision to undertake a contract project, starting afresh, remembering the difficulty that Chalmers Sherwin experienced in making his ill-fated study of common data elements using a panel of government officials.
A decision was made by OST to undertake an independent study of the Federal R&D project-reporting system with the hope that we could take advantage of the work done by Chalmers Sherwin and his ad hoc panel, earlier. The contractor selected

to do the work was Peet, Marwick and Livingston, an organization skilled in making systems studies. The contractor was asked to review the report of the FCST task group on research-project reporting, assess the science and technology reporting systems of the individual agencies, determine the extent and effectiveness of these systems from the standpoint of the variety of users, and to make specific recommendations for an improved governnment-wide project reporting that would be fully utilized by the Federal agencies and their R&D management and technical personnel. A six- months completion period was required as part of the "boiler plate" of the contract. The funds for the study were provided by the National Science Foundation. The final report was submitted to NSF and OST on January 3l, l969.

An analysis of the report reveals that there were three elements of the PML study: a department and agency study to define the capabilities of agency R&D information systems and the ways in which these systems were used by R&D management; a number of user surveys to define typical users of STI in the government R&D structure; and a system design study for defining specific steps to implement a government-wide R&D project reporting system.
To present a clearer background for his recommendations, the contractor prepared design specifications for a Government Information System for Science and Technology (GIST), which consisted of three major components: Agency Information Centers to be strategically located in that part of an agency responsible for R&D management; a Policy Office which would be integral to the Office of Science and Technology and would have the responsibility for organizing the individual Department information centers into a functional government-wide system; and a central Communications Center to facilitate the transfer of information between Agency Information Centers and to refer users to the appropriate sources of information. Against this design background, the PML team made eight major findings, each of which brought a conclusion and recommendation for action. Because there is still a need for a government wide R&D project reporting system, these are summarized as follows:

l. Finding: Existing vcentralized systems lack real utility for most users. Conclusion: R&D management can create effective communications mechanisms, but only users can overcome the functional distance between technical data, management data, and technical management. Recommendation: Agency R&D nanagement should explicitly accept responsibility for R&D communications, and for development of systems to support communication.
2. Findings: There is wide variation in R&D information system capabilities among federal agencies. thus government-wide machine language exchange would not be currently feasible. Conclusion: The variability among processing, classification, storage, retrival and communication procedures among agencies precludes meaningful communication without human intervention. This includes literal transfer of information but also human insights into the strength and limitations of available data and their intended use. Recommendation: Each major agency should appoint a full-time "communicator" to accept operational responsiblity for fulfilling its R&D communication responsibilities.

3. Findings: Agencies have done little to move toward the compatible reporting system recommended by the FCST ad hoc task group report. OST is logically responsible to act as the spokesman for the Federal R&D community. Valid information about R&D efforts is needed by OST and the rest of the Federal R&D community, thus the management of the vital R&D information resources is an intrinsic OST responsibily. Recommendation: OST should accept policy-level responsibilities to ensure that departments of government fulfill their communicdation responsibilities.
4. Findings: The Federal R&D community has not responded to the FCST agreement to implemenmt the Sherwin report, one reason being the lack of understanding of what action was excected. Another reason is the lack of a single accessiom point for obtaining information relative to to diverse activities. he study team also found that there was a lack of feedback regarding the impact of policy requirements. Conclusion: To facilitate the exchange of project-reporting data, a Communications Center should be formed. Recommendation: A central ommunication center should be established to access information concerning ongoing Federal R&D programs.
5. Findings: Many of the Federal agencies have internal R&D management systems capable of yielding "common data elements," specified as the medium of exchange called for by the FCST ad hoc group. R&D management freely expresses the need for better information for internal purposes and to know more about externally generated data with credibility, but there is doubt expressed about STI obtained from central sources, nevertheless. Moreover, data once removed from the source of input that lacks the certification of an agency, is questionable. The use of central systems typically result in redundant reporting requirements at the bench level. Conclusions: Information exchanged by the executive agencies should be derived from information integral to the operations of the agencies, otherwide their accuracy and currency are diminished. To ensure the validity of the data,   there should be management utilization of the data. Recommendation: Information systems should be developed to meet agency requirements, and information made available for interagency excchange should be derived directly from these internal systems.
6.Findings: The 25 standard data elements identified as desirable by the Sherwin task group are actively used in R&D management although the degree of their use in information systems varies widely.

Conclusions: It is within reach of every federal agency to develop and use the 25 standrad data elements. The agencies would be well served by more extensive search and query capabilities based on these data elements.
Recommendation: Agencies should maintain cvertain data elements describing "work unit" reports and program summary reports and should develop the capabilities to respond to

queries based upon these data elements.

7. Findings: The Federal agencies remain unaware of Executive Office and FCST interest in facilitatating government-wide information exchange. Implementation
of a government-wide system through use of BOB circulars is not a popular approach as seen by the agencies.
Agency R&D management privately agrees on the need for more valid and comprehensive information to meet thweir own needs and could benefit from Executive Office participation. Part of the motivation is to demonstrate coordination to Congress.

Conclusion: Interest at the highest levels of government must be made explicit if a useful system is to evolve. Additionally, the utility of a government-wide system must be demonstrated.
Recommendation: An Executive Order should be promulgated to establish policies and explicit requirements for implementing the preceding recommendations.
8. Findings: SSIE is not widely used by the agencies. Some of the functions of SSIE are better exercised by the agencies themselves. The widest use of SSIE is made by agencies with limited data processing capability. Almost 60 percent of SSIE's resources are spent on indexing and file imput data. SSIE gets resource data for less than 50 percent
of the projects on file. SSIE has very linmited ability to provide information of use to R&D management. Agencies using SIE to maintain and process technical data maintain and process management data in internal systems.
Conclusions: Availability of SIEe services tends to contribute to the continued separation of technical from management data, a critical failure for systems serving management.
Recommendation: As the capabilities of the agency systems are developed and the objectives of a government-wide information system for science and technology are realized, SIE should transfer functions supporting departmental R&D management to the government-wide system. During this period, new roles for SSIE should be investigated.

The PML report probably came to the correct analysis and recommendations, but it did receive criticism for failure to provide alternatives, failure to spell out more precisely what the Government Information System for Technology (GIST) would be and how it would operate, failure to discuss costs and benefits of the recommendations, vagueness about the operation of the GIST Communications Center and the GIST Policy Office, and insufficient information about what is happening at the agency level, regarding current project-reporting. Some of the strongest criticism came from BOB representatives who objected to any operational or policy role for the Office of Science and Technology in this area, even though it was evident that the agency and SSIE programs were limping along. This was the death-knell for the PML report. The study team had run out of money to continue its work and to obtain the kind of information and answers demanded by the BOB representatives. Additional funds were unavailable for the purpose. This was another example of how the inflexibility of BOB contributed to the failure of yet another effort on the part of OST and COSATI to make progress. It was difficult to understand the motivation of these middle-level BOB operatives, who at times deomonstrated antagonism to OST's STI role for reasons best known to themselves. It was a rare situation when they took a positive approach to better information processes in the Federal government. It became increasingly clear to me over my EOP years that BOB staff people often acted irresponsibly, demonstrating power, but not common sense. This is an assessment in relativity. BOB's focus was and is on fiscal restraint, a priori evidence that whatever investment is to be made is going to bring substantial and sure gains free of political criticism. With this mindset , it was surprising that there ever was a space program or a nuclear energy program, but these had powerful champions in the White House, in Congress, and in the industrial sector. With such support, aided and abetted by the media, even BOB could not withstand the tide. The information revolution was another matter, because of its diffuseness and because BOB lacked a staff of information experts, who were well aware of the potential gains that could be achieved. In effect, BOB was ill-prepared for the Information Age. This was evident when the use of computers in the Executive Branch proliferated wildly in the l960s. It took the Brooks Act that set up a three-agency computer monitoring group (Bureau of Standards for computer standards, General Services Agency for computer procurement, and BOB for general oversight of the Federal agencies in computer matters). This was not an Administration initiative in the slightest. During this period, the major fixation of BOB was on the computer rather than the information systems where they were being used. The BOB individuals who interacted with OST and COSATI on information matters came from the budget examiners' side of BOB. Most of this group were involved with science and technology programs; none of them had cut their eye teeth on information matters. The most vociferous of these examiners came from the fringes of science. Hugh Loweth, the long-time chief of the BOB science and technology group professed on several occasions his lack of understanding of information systems and how frustrating they were to him.

Against this background of ignorance and frustration, it was almost predictable that the PML report would be viewed with skepticism by BOB, just it had with the recommendations of the COSATI Task Group on National Information Systems for Science and Technology.

Appendix A of the PML study was titled: Exposure of Government Technical Employees to Research Activity Within Their Fields. The appendix was, in effect, a "sleeper" in the final report. It was undertaken by PML without previous discussion with OST. In the report, PML states that the study team undertook the project under separate contract, not specifying the source of funds. The intent of the study was to test the level of awareness of government scientists and engineers to relevant technical efforts in other organizations. While the major PML study used interviews as the major source of information, this study was conducted by questionnaire. The finding of this separate undertaking was that there is a lower level of awareness in the bench-level scientific community than that community has indicated to the survey team. The study team effort raised several speculative comments by members of the team, calling for further investigation. The first area of speculation concerns the identification of those people who are knowledgeable of ongoing research and those who are not. The report states:.

    A reasonable hypothesis is that those people who have
    the greatest knowledge of ongoing research are the
    contracting officers and the members of the coordin-
    ating committees--renowned scientists who serve on
    panels at scientific society meetings. Those who are
    less well informed are the bulk of the scientists
    working at the bench-level or in middle management
    positions, who, in fact, probably have the greatest need for this data. If we estimate that less
than five percent of the scientists in government are
provided with sufficient funding to attend just one
meeting a year, then 95 percent of the scientific community is left out of the so-called "invisible
college" that communicates so well...We are suggest
ing here that communication to the total scientific
    population through scientific meetings of various
    types is an inefficient process.

The investigator chose the field of fluidics, which at that time was about ten years old, to study. There was in being a fluidics coordination group in the government. Major conferences were being held on the subject in the United States and Europe several times a year. It was a rapidly growing field of inquiry. A Fluidics Awareness Questionnaire was prepared to be sent out to a group of individuals involved with fluidics research. Earlier, an Air Force group had distributed a review of non-government-sponsored R&D in fluidics in an effort to promote technical communication between the government and the commercial sector. The intent of the questionnaire was to evaluate the level of awareness of fluidics activity which the recipients of a directory possessed prior to its distribution. The list of organizations involved with fluidics R&D was padded with 25 additional organizations known not to be involved with fluidics plus l0 fictitious organizations. Here are a few of the interesting findings: (l) 75 percent of the respondents were aware of the involvement of less than l/2 of the government installations in fluidics. (2) Only 20 percent of the respondents were sufficiently familiar with government fluidics efforts to know the nature of projects in over l/2 of ther government laboratories. (3) Fewer than l0 percent had seen research reports from more than l/2 of the universities doing fluidics under government grants and contracts. (4) In general, there are a few moderately well informed people amid the mass of largely uninformed engineers. The few who turned out to be moderately

 well informed were the members of the Fluidics Coordination Group. It was also found that government researchers had a higher degree of familiarity of the fluidics work of outside contractors than they had of fluidics work in other governmental laboratories. The researchers also learned that the members of the Fluidics Coordination Group did little to transfer their information to others in their own laboratories. The researchers wisely pointed out in the PML report that further research on the subject of invisible colleges and information transfer among engineers in the same field should be conducted.

For several reasons, the OST personnel decided not to publicize this part of the PML report. The first and most cogent reason was our recognition that more studies of this kind were needed before we could be sure that the investigators were on sound ground. The second reason for not publicizing the report was our unwillingness to upset the legion of scientists and engineers who attribute magical qualities to their cherished "invisible colleges.~ Nor did PML do anything to disseminate the results of the invisible college study, which it had undertaken on its own volition, which we thought was a good decision.. After all of these years of silence, this story is being told in hopes that there will be a few honest and

realistic studies on this subject in the future, studies preferably undertaken by scientists, interested in understanding more about the information culture of their profession.

A reasonably reliable portrait of the scientific and technical information programs of OST and COSATI during the early part of l969 is revealed in a presentation document prepared for the new Director of OST, Dr. Lee DuBridge by Andrew A.Aines. (9)
(9) Aines, Andrew A., OST, A Presentation of the Scientific and Technical Information Systems of COSATI and OST, Submitted to Dr.Lee DuBridge, Director, OST, February l969, pp 20.
We felt it very important to encourage DuBridge to maintain the STI program as did his predecessor in his five years of service.   Although it appeared evident that the latter had given DuBridge a briefing on the subject of STI before he left, it was recognized that DuBridge was probably saturated with information about the programs of OST and FCST, hence would not remember what Hornig had passed on about STI, except in very general terms.
The presentation started off with a few statements made by American Presidents and members of Congress on the subject of science communications and its importance to scientific and technological strength. It then sought to anwer the question: "Why are we involved?" Eleven reasons were given;.
A few of them are set forth for illustration in "bullet" form:
    o Proliferation of information generators and users
    o Rapid increase in volume of scientific and technical information and data

    o Increase in the number of mechanized information

systems with a considerable impact on the more conventional

ones

    o Soaring costs of information-processing which is now

"Big Business"

    o Internationalization of major information systems

The next discussion item involved the extent of Federal funds obligated for STI for fiscal year l968. The purpose of exposing these costs to DuBridge was to give him a feel for the magnitude of the government-wide effort. Thirteen agencies were scheduled to spend $535 million for STI. Not included was an additional $295 million reported by the Department of State involving Agency for International Development dissemination and research programs.

The next item in the presentation was a description of the goals and the objectives of the OST and COSATI STI programs. These dealt with improving the prductiveness of Federal R&D programs through better coordination, information-sharing, management, and the like. One goal was "To encourage the private tax-paying sector to develop supportive programs and new information services in lieu of the over-development of government data programs." Another goal was to stimulate techology transfer and government-generated STI utilization in the United States.

The next item was the display of the latest COSATI organization chart that listed l2 Federal agencies as members and l4 more as observers. Seven active panels were listed: Operational Techniques and Systems, Information Sciences Technology, Education and Training, International Information Activities, Management of Information Activities, Information Analysis Centers, and Legal Aspects of Information Systems. The chart also showed six task groups in operations: Synoptic Data, Steering Group, National Systems, Library Programs, Dissemination of Information, and Technology Utilization. The size of the COSATI operation can be deduced from the above, about 250 to 300 people working together as a team to support Federal R&D.

Listed among the contributions of COSATI were such items as: establishment of the Clearinghouse for Federal STI, establishment and support of the National Standards Reference Data System at the National Bureau of Standards, support of the Department of Commerce State Technical Services Program, establishment of the National Advisory Committee that ultimately became the U.S. National Commission on Libraries and Information Science, the establishment of the NAS-NAE Committee on Scientific and Technological Communication (SATCOM), and stewardship reviews of Federal STI programs of the Federal agencies.

This was followed by a list of PSAC, OST and COSATI reports and studies, most available from the Federal Clearinghouse for STI.

To give DuBridge a feel for what challenges and opportunities were anticipated, the presentation included a section called current, mid-range, long-range and continuing issues. On the whole, the predictions of the shape of things to come were accurately portrayed, but what was not anticipated in l969 was the loss of high level support of Federal STI programs and the precipitous disappearance of the better Federal STI managers in the next decade. The presentation ended with a quote of DuBridge made in the ll August l967 issue of SCIENCE. DuBridge wrote:

    If the world's troubles seem tragic and complex,

    this is not because we have too much knowledge,

    but because we have not learned how to use all our

    knowledge effectively.

His observation was true then; it is true now; and, on reflection will always be true.

One lesson that did not take long to learn was that no matter how well you think that you are doing a job, be prepared to be criticized without getting angry, unless that criticism is unnecessarily rancorous. Case in point: a questionnaire was sent to the COSATI members and observers asking for their views about COSATI and its program. In particular, the request was for a statement of value of COSATI to the individual agency, what new programs were needed and what old programs ought to be terminated. The answers from the agencies were generally favorable, but there was one from the BOB observer, Robert E. Howard that was a real attention-getter.

Howard pointed out with justification that COSATI's charter was very broad, encompassing scientific and technical publications and document-handling, R&D in information transfer, educational programs for information specialists technology utilization and transfer, data banks, and other programs. This has made COSATI one of the largest of FCST's committees. Relative to this considerable effort, he pointed out, COSATI's concrete achievements have been small. He then went on to state that COSATI has made no significant contributions to the substantive information problems relating to the needs of the several disciplines and other problems that need attention. He then suggested that COSATI reduce the size and scope of its program, become more involved with substantive matters, include research managers as full members, and involve OST staff members who have substantive knowledge of research fields. Howard tempered his remarks with a compliment to the COSATI chairman who has

"shown remarkable energy and ability." (l0)

(l0) Howard, Robert E., Bureau of the Budget, Executive Office of the President, Memorandum to Colonel Andrew A. Aines, Chairman, COSATI, Subject: COSATI, February 3, l969, pp 2.

After thinking about this criticism, Aines responded with a

"thank you" note, acknowledging the memorandum

and the validity of some of points Howard made, but reminding Howard at the time that he was treating COSATI as though it existed separately from its parent body, FCST. Moreover, FCST, which had no directive power, had no way to force the Federal agencies to honor their agreements made with FCST. BOB could use its much more considerable power to "convince" the COSATI-folk in the agencies to honor their   agreements made in FCST. If COSATI reduced its programs, it would be illogical to expand its interplay with the learned societies. Aines then promised to share Howard's letter with the COSATI Steering Group. The lesson that was derived from the exercise was not to expand the size of COSATI unnecessarily. The notion of asking research managers to serve as members of COSATI was discarded as impractical, since this would expand the size of COSATI and complicate the problem of which agency member had the voting power.

Moreover, it was pointed out that the members of FCST were the research managers of the agencies and only they could approve and authorize what COSATI could do. Insofar as working with the staff members of OST, this had always been the policy of William T. Knox, my predecessor, and me. The latest example was my unsolicited suggestion to Dr.John Buckley, suggesting that an Environmental Quality Information and Analysis Center be established under one of the agencies that would operate under his policy guidance and produce key environmental data for the use of OST, FCST, and Congress, as required. I pointed out to Buckley that there more than l00 information analysis centers supported by the Federal government and not many of the fields being covered by these centers was as important or active as environmental quality. (ll)

(ll) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: The Science Communications Week, February l, l969, pp 4.

The use of capital-intensive equipment for information storage and retrievable made it inevitable that users would be required to absorb some of the costs of information handling. TThe COSATI members and observers were also aware that there was a need for uniform user charges, so that it would not be possible for one Federal information dissemination program to levy heavy charges on its

users while another virtually gave its technical reports away to other users. The members of COSATI were informed that until a new FCST-approved policy on uniform user charges was established, it was OST policy that agencies need not assess users for the full cost of technical information and, in addition, that there should be no rapid action to fix user charges by the agencies until COSATI (and FCST) reached some kind of a consensus. This interim policy was adopted to determine if the members of COSATI could reach consensus. BOB went along with this approach.

NASA then announced that it would start charging its users for full-size copies of unclassified, unlimited scientific and technical documents distributed through the Clearinghouse for STI, thus paralleling the policy of DOD. (ll)

International

An international problem occupied some of our attention for a short period. The American Chemical Society was upset because the Soviet government aggressively and on a large scale was copying its publications without paying royalties. ACS leaders had visited with the Soviets and had lodged protests. As a courtesy, a copy of the letter of protest to the USSR was sent to OST by ACS. This matter was discussed with Dr. Milton Harris, chairman of the ACS board of directors, who was told that there was a considerable difference when the discussions were being held with the Soviet government rather than with professional societies. This initiative on the part of ACS without conferring with the State Department had piqued the COSATI representatives from that agency. Their feeling was that there should have been a courtesy letter at the least. Of course, ACS was at a disadvantage, since the Soviet government is omnipresent even in scientific matters, thus ACS could discuss its concern with government officials only. Asking the U.S. Ambassador to the USSR to discuss an issue of this kind with his Moscow counterpart could be considered "overkill," but his subordinates, if they tried to talk to Soviet under-officials, might have had even less success. After a number of years had passed, the Soviet Union began to honor the copyrights of other countries, but it took a long time.

Since it was common practice for U.S.corporations to conduct
business directly with the Soviet Union during that period,
there was always discomfort at the State Department when it found out about such discussions. On the other hand, this state of affairs was probably enjoyed by the Soviets, who continue to play this game currently. (ll) Ibid. They are quite aware that the United States government will not take on the political mantle of the communist bloc just to become the sole neogiator of the country. The relative freedom of our citizens to act freely, even in dealing with monolithic states, will not be sacrificed. Hence, although the State Department fumed, the American Chemical Society did the right thing in seeking to get the Soviet government to honor ACS intellectual property rights.

Interestingly, although BOB's Bob Howard was critical about the Peat, Marwick and Livinsgton report on project-reporting, a strong sentiment began to become manifest in OMB that favored action in this field. One reason for this change was an earlier intervention by Senator Mansfield, who gotten involved earlier with a review of the titles of Federal R&D projects. The senator had demanded and received a "truck load" of Federal reports, which he wanted his staff to review to determine their "worthiness," whether or not they could pass his litmus test of acceptability. Growing out of his unhappiness in receiving an unexpected mass of material, the senator and his staff became aware of the need for an improved agency-wide R&D project reporting system.

Having been told about the purpose of the PML study, it was their feeling that immediate steps ought to be taken to create a government-wide system. When this intelligence was passed on to BOB, that agency called for a strengthening of the PML report and more rapid action to implement it.

OST pointed out that the contractor had not yet provided an appendix that was one of the requirements. Admittedly, there was some resentment of BOB's sudden support of the study, its desire for more rapid implementation, and the pressure being exerted on OST. One practical problem was the fact that the contractor had run out of contract funds and NSF could not supply any more. (l2)

(l2) Aines, Andrew A., OST, Memorandum to Dr. Lee DuBridge, Director, OST, REPORT, February 6, l968, pp 2.

One area of interaction, not mentioned too often in this account, is the considerable amount of involvement that OST and COSATI had with the private sector. Some of the contact was made by groups or individuals in the private sector and some of the initial reaching out was initiated by OST.

Some of the outside groups thought that OST had more power
than it really possessed to require the Federal R&D agencies to conform or respond to its views. For example, John Thompson, Arthur D. Little, Co., stated that his firm had about l00 clients in industry who had been developing information and retrieval systems. Their goal was to use diverse tapes generated by NASA, AEC, Standard and Poor, Dun and Bradstreet, and others, but the lack of similar standards and compatability made this impossible. He was informed that we were quite familiar with this problem, and that COSATI was seeking solutions to promote improved interchange within

the government. It would not be easy to accomplish this goal in the near future, but the economics and standards-building movements going on in the information business would ameliorate the present difficulties. Just when this would materialize was difficult to predict.(l2)

In a related era, the U.S. Department of Justice was filing anti-trust suits against IBM. Aines suggested to DuBridge, when describing thie situation to him, that OST might consider getting into the picture from the science and technology standpoint. He wrote, (l2)

The question must be asked - is this action going leave the country in a stronger or weaker position�as the
    world leader in computers? Would the smaller computer
         companies experience a new surge of growth that would increase national strength or is IBM being penalized
because something in our mystique distrusts large size and success?

Just how Dr. DuBridge felt about the question of the IBM suit went unanswered, but the assumption was made that this was not an issue for OST to get itself into. The matter was dropped. Also raised in the February 6, l969 memorandum was the status of the Networks for Knowledge initiative of President Johnson. Here again, there was no response. This marked the end of the K-Net project; the window of opportunity had closed for this once-promising project.

Much akin to the present effort on the part of the two branches of the Federal government to reduce the massive Federal deficit, there was a similar push during l969.

In response to a front office request, a memorandum was prepared about the effect of budget cuts in the information area. (l3)

(l3) Aines, Andrew A., OST, Memorandum to Dr.Hubert Heffner, Deputy Director, OST, Subject: Summary of Budget Issues in the Information Area, February l2, l969, pp 4.

In essence, there would be a reduced flow of STI to the private sector from the Federal government, as well as a reduced flow of STI within the government. This could result in increased duplication of R&D in both sectors. There could be a reduction of STI gathered from international sources. In addition, there might be a dimunition of information and data needed to make timely administrative and technical decisions and to solve problems, such as those in the environmental quality area. Another negative fallout might be experienced in agency inability to repackage information and and data for technology utilization purposes.

To maintain their programs, agencies would be forced to increase service charges for their STI reports to the public, a move that could cut dissemination seriously. The Clearinghouse for Federal STI was then contemplating raising its selling prices from a blanket $3 per document to figures several hundred percent higher.

The shrinkage of Federal R&D funds will also decrease the amount of dollars available for the payment of page charges to the scientific journals, thus harming them economically. Similarly, technical journals and other publications produced by the private, for profit sector, an important
source of STI, would suffer. Another program that could be curtailed with possible negative effects would be attendance of scientists and engineers, in and out of the government, at scientific and technical meetings and seminars. Critics might conclude that this would be a good development, but sober thinking should dispel this notion.

The memorandum then pinpoints what may result at AEC, the Department of Agriculture, Commerce Department's State Technical Services program, NLM, FDA, Office of Education, NSF, the Science Information Exchange, and others. All of these and other Federal agencies were scheduling serious cuts in their STI programs. Finally, it was apparent that the offices of the Federal agency STI focal points, where the STI management was centered, would also be hurt by reductions. This was considered to be very serious, since there was evidence of erosion of several of these programs even before this budget crunch. In anticipation of a continued migration into advanced computerized databases and networks in the near future, budget reductions in Federal STI programs could have an adverse effect on Federal R&D. OST should make a strong statement to BOB to prevent budget shrinkage in the Fwederal STI area for the above reasons.

Reflecting on the events of the late l960s and comparing them to the present brings an uneasy feeling of deja vu, but it also stimulates another thought - the erosion of Federal STI programs started years ago, not only during the last two adminstrations. It has its roots in the failure of the Federal R&D managers in sponsoring strong internal STI programs, in the failure of private sector scientists and engineers who did not take the recommendations of the Weinberg Report to heart, in the departure or loss of the experienced Federal STI managers, in the failure of Congress
and the Executive Office of the President to maintain strong interest in science communications.

While OST was heavily engaged in improving Federal and national scientific and technical information programs, it was

also deeply involved in international STI affairs, especially those that were being conducted in the Organization for Econonmic Cooperation and Development (OECD). The other 23 countries that comprised OECD in addition to the United States recognized that the United States had very rapidly become the most advanced country in the world in information science and technology. They also were aware of the tremendous strides made by the U.S. in modern science communications, especially in the government and the American learned societies sector. It was made clear to the members of the OECD Information Policy Group (IPG) that it was our intention to keep them acquainted with what was going on in the U.S. and to do everything in our power to help them, even to the point of sharing some of our governmental STI bases with them. Several of the panels organized by the IPG were modeled after those in COSATI during the l960s. It was also our policy to send experts to Paris whenever these were required.

An example of this cooperation was the formation of the OECD's Secretary-General's Ad Hoc Group on Scientific and Technical Information, chaired by Pierre Piganiol of Paris. The U.S. member of this group was Dr. Lewis Branscomb, who at that time, early l969, was a member of the President's Science Advisory Council, Executive Office of the President and Chairman, Joint Institute for Laboratory Astrophysics,. Boulder, Colorado. In calling this group together , the Secretary General was responding directly to the recommendation of the Ministers of Science in l968 that OECD should take a very close look at broad policy problems in this field through the eyes of a few eminent but independent individuals, rather than through national representatives. (14)

(l4) Wait, Carl, U. S. Mission to OECD, Subject: First Meeting of the Secretary General`s Ad Hoc Group on Scientific and Technical Information, January 2l-22, l969, pp 4.

The final report of this task group, " Information for a Changing Society; Some Policy Considerations," (l97l) was one of the best turned out in this genre of reports. It was prepared by Mr. Piganiol with the assistance of Dr. Branscomb. Also assisting in the preparation was Dr. Edward Brady, National Bureau of Standards. For many years, Brady was the Department of Commerce's representative to COSATI, and a valuable one at that. Dr. Philip Hemily and Carl Wait of the OECD U.S. Mission, both of whom were splendid thinkers and workers, were especially complimentary about the contributions of Branscomb in the work of the ad hoc task group.

The intervention of Senator Mansfield and his staff in Federal R&D project reporting brought another dividend - some hard thinking on the subject by Dr. Charles V. Kidd, the Executive Secretary of the Federal Council for Science and Technology. Dr. Kidd prepared a paper which described the current process in anticipation of sending a note to the senator.(l5)

(l5) Kidd, Charles V. Kidd, Executive Secretary, FCST, Notes on a Report for Senator Mansfield on Project-Reporting," February l9, l969, pp 6.

In his introduction, Kidd wrote:

The rapid growth of support of R&D by the Federal government, reaching a level of $l7 billion, has generated public policy problems of the highest importance. These range from military technology to building technology. The tremendous potentialities of science and technology for affecting such vital concerns as elevating economic standards, for harming man's environment, and for dealing with the world's food and populations problem make it imperative that the entire activity be thoughtfully planned and carefully evaluated. Ultimately the questions become matters of political and moral choices,so the Congress has a vital interest in knowing about what is going on, and the possible ultimate consequences of current and past investments in science and technology. The very magnitude of the expenditures on sciences and technology forces attention to the efficiency of the total enterprise and to the general consequences of spending such huge sums. Kidd then stated that proper questions could not be answered, and in some cases not even asked, without information. Knowledge was required, he went on, when it deals with the problems of priorities, efficiency, avoiding duplication, and congressional needs. The PML study has shown that the Executive Branch has the capacity to provide Congress with the information it needs. He admitted that the computer-aided capability was largely developed with the prodding of Senator Hubert H. Humphrey. The current request by Mansfield resulted in the preparation of computer tapes weighing 500 pounds, covering data on 29,000 projects. This product was of little use for Copngressional purposes. More properly organized, the information required can be broken down into all categories useful to congressional committees. Kidd followed with the observation that generalized inquiries for agency data produce generalized but useless responses. Congress does not have the staff and the facility to analyze the data which could be provided by the agencies, thus is falling behind the Executive Branch in this capability, but it is also a fact, according to the PML study team, that present information systems are less responsive to management the higher the level in the agencies. Moreover, the Executive Departments are inadequately staffed at the top to monitor, coordinate and use with effectiveness the sub-systems that exist within each of the departments. Also evident to the contractor was that means of exchanging information among the agencies and departments in the Executive Branch are inadequately developed.

The contractor concluded that what was missing were small, high level, high quality staffs responsible for the development and management of information systems responsive to top levels of management in the departments, and the development of effective mechanisms for transfer of information between departments. The contractor concluded, Kidd pointed out, that this approach would be superior to the development and maintenance of an organization whose function it is to draw together in one place detailed information on all research projects supported by the Federal government. An organization of this kind currently exists, the Science Information Exchange, but its functions should be drastically changed, one of which

would be the provision of expert staff help on improvement of the design and operation of the information systems of individual agencies. It would also be called on to facilitate interagency exchange of information and to provide information to the Congress and the Executive Office of the President. The Science Information Exchange would also be called upon to provide a small staff in the Executive Office of the President to assist in the guidance and monitoring of
the entire Federal R&D reporting system. As can be clearly recognized in his statement, Dr. Kidd found that the guidance of the PML report made sense and had his support. The record does not show if there was any response from Senator Mansfield and his staff, probably not. Those who are familiar with the ways of Members of Congress recognize that their attention span is limited by necessity as they try to keep up with changing trends and issues. Had Senator Mansfield kept up the pressure on OST and the Federal agencies insofar as Federal R&D project reporting was concerned, one can conjecture that there would be a system in place that reflected the astute advice of the PML study team.

GIDEP

One of the more interesting information groups formed during the l960s was the Interagency Data Exchange Program, better known by its acronym, IDEP. Currently it is called the Government-Industry Data Exchange Program (GIDEP). As its name implies, it was a linkage program binding the two sectors together to share test data on electronic parts. Almost from the start, this program was a success. Its members were mostly from the aerospace industry, the Department of Defense, and NASA. As it continued to grow, an association with Canadian and Swedish interests was formed. The initiative for adding international partners came mostly from scientists and engineers from abroad. Periodically, GIDEP's officers met with members of COSATI to discuss matters of current interest. IDEP became enthusiastic about national information systems and, using its own resources, established a committee on an STI network.   A team presentation was made to COSATI on December ll, l968 and a copy of the presentation was made available February l969 to COSATI. (l6)

(l6) Information Systems Network Development Committee, Interagency Data Exchange Committee, Presentation to COSATI and observers on "A Concept for a Scientific and Technical Information Network," December ll, l969, pp 54 (Includes 5 appendices)

The original concept for the network was offered by the IDEP Policy Board chairman, Daniel E. Negola, NASA Headquarters, in l968, but his suggestion encompassed only a network in the aerospace field. Later, this was broadened to cover all of science and technology. Thereafter, IDEP formed the Information System Network Development Committee to undertake the work. The terms of reference called for the development of a concept for " establishing a practical, economical and flexible information network system linking Government-funded information sources and centers."
Network characteristics were established to assure a successful network: data must be readily available; the data must be needed; data must have a uniform input and output; data must be retrieved in a simple way; a universal system of communication must be employed; network personnel must ber strongly motivated; data must be available at low cost; and there must be a good government/industry working relationship.

It became evident to the COSATI audience that what was being proposed was a greatly enlarged IDEP, modelled after the telephone system, which would link users to sources of information, most of which would be government-generated. This was a far cry fron the national system concept that COSATI had been considering. The COSATI members explained this reality to the briefing team, but expressed their deep appreciation that IDEP was sufficiently public-spirited and motivated to carry its proposal to Washington.

From the time of its inception, I have been interested in the IDEP concept for these reasons: (l) It came into being because a specific information-needing community saw the value of such a program as a means of saving money and valuable time. (2) It has some of the characteristics of an information analysis center. (3) It could be the prototype of a series of similar information centers combining public and private sector information service groups. (4) It was the kind of program that made it possible to demonstrate the
value of STI to R&D and other managers. The potential of GIDEP-like information programs is strong, indeed, currently, but we need to have entrepreneurs who are willing to explore opportunities and, when found, work hard to bring them into being. We can hope that the "marketplace" will stimulate the growth of this segment of the information community. A more direct route would be a focused governmental effort to encourage groups to undertake similar programs with a minimal amount of government support. This was one of the reasons that the GIDEP program flowered. It should happen again.

During the late l960s, there were efforts to expand cultural arrangements between the United States and the Soviet Union. In the course of events, scientific and technical information and comnmunication were deemed worthy of inclusion by the sponsors. At the outset, only critical data matters were to be discussed, but with the passage of time, consideration was being given to a much broader spectrum of STI matters. It turned out that the original impetus for
discussing critical data resulted from a Soviet initiative. Because of an issue arising from an earlier visit of a Soviet group of information experts, it was decided that there should be a meeting of the Department of State and OST to discuss this part of the cultural exchange agreements. (l7)

(l7) Aines, Andrew A., OST, Memorandum to Dr.Lee A. DuBridge, Director, OST, Subject: "Weekly Report on Science Communications Program," February 22, l969, pp 3.

Originally, there were to be two meetings, one in the United States and the other in the Soviet Union. After the passage of more than a year, Aines prepared a letter to Mr. Arutyunov, the top level Soviet science communications official, to start the procedure to resume the exchanges and sent it to the State Department for further action. For reasons best known to the State Department officials the letter was never sent. This was also a matter of discussion in the meeting called by Aines, who recognized that the political barometer of West and East relationships was the reason for the hangup. Since the Soviets initiated the new round of meetings, the State Department could no more than react. Although no new steps were taken to accelerate the meetings, there was a general agreement that the next meeting would be one focusing on the narrower issue of critical data. As usual, we came away from the interaction with the State Department feeling that it completely lacked an understanding of the effect of the Information Revolution on modern society, quite apart from international relationships between countries.

During this period, Dr. Dubridge visited with the French Minister for Industrial and Scientific Development, M. Francois X. Ortoli, to consider cooperative projects and to develop new areas of scientific exchange. They agreed to continue to exchange space and transportation research information and increase exchanges in the disciplines and technologies relating to environmental and urban problems.(l8) They also agreed to seek a prompt increase in the flow of scientists and other specialists between the two countries.

(l8) News Release from the Office of Science and Technology, Executive Office of the President, Subject: Joint Statement on Franco-American Scientific and Technical Cooperation, September 23, l969, pp 2.

While in the Executive Office of the President, I saw the release of a series of such releases, but never witnessed the establishment of a program or project to implement the so-called agreements. I doubt that almost two decades and countless exchange agreements later have matters improved significantly.

Yet, it was U.S. policy to make our hard-won technical information available to the rest of the world. Apollo astronaut, Frank Borman, reported during a trip to Europe that well-wishers in Europe found it hard to believe that the United States would spend all of that money on its space program and then make public everything we learned. (l9)

(l9) Aines, Andrew A., OST., Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Review of the Week, March l, l969, pp 3.

Aines then reported to DuBridge that similar comments had been reported in the press, one being made by President DeGaulle of France, along the same line. On the other end of the spectrum, two Canadian scientists had complained during a recent international meeting on space in Vienna, Austria, that the two superpowers, the United States and the Soviet Union, were not making information gathered during overflights available to even those countries being overflown. The comment to DuBridge concluded with a prediction that this would be a tension point in the future that the United States should recognize. It was not long after this that the United States put machinery into operation that did make LANDSAT data more available to other countries.

Largely based on the COSATI paper on Policies Governing the Foreign Dissemination of Scientific and Technical Information by Agencies of the U.S. Government, which was approved by FCST subsequently, the Department of State prepared an additional policy paper with the title Guidance on Exchange of Unclassified Scientific and Technical Information With Countries With Which We Do Not Have Diplomatic Relations. (20)

(20) Pollack, Herman, Chairman of the International Committee, Department of State, Guidance on Exchange of Unclassified STI With Countries With Which We Do Not Have Diplomatic Relations, March l969, pp 2.

This was released in March l969 with the approval of the COSATI Panel on International Information Activities and the Office of Science and Technology. If the Department of State had been alert and properly organized, it is very probable that the COSATI version would have not been issued to the Federal agencies. Both documents were similar, since the State Department version was largely based on the original COSATI policy document that appeared in March l968, one year before. In fairness to the Department of State, it undertook the preparation of its policy statement to clear up the possibility of inconsistency with the Munitions and Export Control Acts of the Departments of State and Commerce. Not all agencies involved with implementation of these two acts were members of FCST.

During the November l4, l968 meeting of the Panel on International Information Activities, Scott Adams, NLM Deputy Director, recalled that the early plans of NLM included OECD as a platform for organizing an international consortium which would be responsible for the development of the MEDLARS-based system in Europe. Under this plan, NLM would be responsible for establishing a single center in one of the European countries to provide MEDLARS services. Not unexpectedly, the OECD representatives were unable to agreee on a single European location, nor did they make any progress in creating the necessary budgetary mechanism to support the activities of the consortium. This is why NLM had to abandon this approach in favor of agreements with individual countries which wanted to exploit the MEDLARS tapes. NLM decides that with this approach, it would be able to negotiate about one bilateral agreement per year. This failure on the part of OECD countries had an effect on the strategy of the American Chemical Society, according to Dr. Burton W. Adkinson, NSF, which concluded that the best way to use OECD was as a general channel through which to negotiate

bilateral agreements. The notion that the individual countries in Europe could easily come to an agreement that would favor countries other than their own seemed to be unrealistic. The experience of NLM and ACS should not be forgotten. (21)

(21) Hoshovsky, Alexander G., Executive Secretary, Minutes of COSATI Panel on International Information Activities Meeting, held at the old Executive Office Building, Washington, D.C., November l4, l968, pp 4.

Interaction with the Private Sector

In the meantime, OST and COSATI continued to interact with individuals and groups from the private sector, who were keenly interested in what they were trying to accomplish

in the science communications area. It was decided to ask the National Academy of Sciences to send a formal observer to the COSATI meetings, so close had interaction with this group become. A neeting was held with William Knox, former chairman of COSATI, who at the time was a vice-president at McGraw-Hill, the publishing company. Knox was pushing the view that providing page charges for contributors to scientific journals was outmoded and should be eliminated. We disagreed with his recommendation. Gus Simpson, Battelle Memorial's information expert, who on occasion contributed to the COSATI program, called for a tougher OST information program, clearer policies on U.S.-U.S.S.R. relationships in the STI area, and a more intelligent DOD policy on information analysis centers. Representatives of the National Security Industrial Association, which had been keeping a close watch on the activities of COSATI, met with Steve Rossmassler to find out if it could find new a new avenue to more formal relationships. A meeting was held with Ward Crary of the Chevron Corporation, who volunteered the information that some Federal agencies did not measure up in the dissemination of information. He mentioned the Department of Interior, Office of Saline Water, Office of Coal Research, The Federal Water Pollution Agency, National Air Pollution Control agency, and for good measure, threw in the Office of Science and Technology as government organizations who were not disseminating their information as efficiently as they should. We asked him to send us a letter of particulars, but, as expected, this was never forthcoming. We did agree with him, however, that none of the agencies were doing as well as they should, and we would contact all of the COSATI member agencies to remind them to register each one of their new reports with the Clearinghouse for Federal Scientific and Technical Information.

A meeting was held with the president of the Interuniversity Communications Council (EDUCOM), Dr.Jordan Baruch, who was extolling a new EDUCOM program to create small microfiche

libraries for small or junior colleges unable to support adequate library collections. The problem that he was reporting dealt with microfiche standards; the COSATI standard called for an l8 to l ratio, while EDUCOM sought a 42 to 1 ratio. We agreed that future microfiche readers should have lens arrangements to make possible their use with different standards. Interestingly, in the present there is little talk about microfiche and low cost readers, even though they are widely used. Newer technology, employing optical disks, is now the rage, but in early l969, we were trying to get a microfiche reader for OST.

What is now antique technology had not yet come to the Executive Office of the President, even though COSATI had probably pioneered the first microfiche standard in the United States.

The COSATI Panel on Legal Aspects of Scientific and Technical Information continued to explore problems and issues in this genre. An interesting meeting was held by this group, chaired by John Farmakides of NASA, that brought together FCC Commissioner Nicholas Johnson, Professor Arthur Miller, then of the University of Michigan, now at Harvard University, Bella Linden, a leading copyright legal expert, and others from the Congress. Professor Howard Hilton, professor at Pennsylvania State University, made a historical review of communication revolutions; Professor Arthur Miller "worried" about issues of policy; and Nicholas Johnson held forth on some of the problems resulting from new information technology, especially CATV. Johnson also stated that he was pleased that COSATI had the foresight to create the panel and asked for permission to attend some of its meetings in the future.

Dr. DuBridge was sent a copy of the COSATI report, "The Role

of the Technical Report in Scientific and Technological Communication, which was prepared by Dr. Sidney Passman, U.S. Arms Control and Disarmament, and his task force, as an example of the work of COSATI members. This report was made available from the Clearinghouse for Federal Scientific and Technical Information.

The work of COSATI was a stimulant to other Federal agencies during this period. A meeting was held with William Hooper, OST, who had staff responsibility for HUD-type programs, and a group from HUD about setting up a project-reporting system for housing and building technology. The Science Information Exchange leaders were asked by OST to assist HUD in this project. Roger Feldman of Robert J. Brown's staff (White House Assistant for Black Economic Development) asked for help in adding to the OST information sciences technology data base information pertaining to his mission. This was deemed impractical. Ralph Sullivan, Office of State Technical Services, was the first government agency researcher who requested authority to connect to the information bank of the COSATI Panel on Information Sciences

Technology. A presentation was made by Aines before the Computer and Information Science Institute which was held at the National Security Agency on the subject of The Pragmatics of Network Building. The stimulants and obstacles involved in establishing Federal, national and international information networks were discussed by Aines, but his greatest stress was put on the need for information systems that worked functionally, rather than just mechanically. A second presentation was made at a seminar devoted to the Computer in the Service of Society, which was jointly sponsored American University and Pergamon Press. Aines' contribution was a paper on The Quest for National Policies for Information Systems. In this forum, Aines argued that the concept of an overall national plan of policy embracing national information systems was flawed and virtually unobtainable. Rather than a Grand Scheme of this sort, there should be an all-out effort to build individual sub-systems designed to serve real users. At the same time, a set of carefully prepared guidelines should be fashioned that would help in achieving an harmonious array of purposive, interacting information systems in the United States. One of the serious obstacles that would be encountered was the economics involved. In the world of science and technology, another problem was the lack of fervor among many scientists and engineers for an institutionalized information system. Others members of this community were afraid that they would be consumating a Faustian romance with the computer, which they considered the deus ex machina of our age.

Early in March l969, a congressional-Executive Office of the President meeting was held. High on the agenda was a discussion of the extent of knowledge of the Executive Branch in what was going on in Federal R&D projectry and what information procedures were in place to assure proper control. Warren H. Donnelly, Legislative Reference Service, Library of Congress, who acted as the scribe for the meeting, wrote, "

The quality of agency management decisions about research would seem to depend upon the kind of information available and how readily available it may be. It seems that the present information systems are aimed at the users in the laboratories and are filled with find detail, but contain little overall description and stock-taking. When something new comes up that requires research, it seems that management have to rely upon what they personnally know, and what personal contacts they havbe. This seems to depend too much on happenstance that the men who to make the decisions have this knowledge and know who should be called. Looking at research, the utility of present information systems varies. For pioneering type research where the scientific traditions of free and early publication held, the information can be excpected to get into scientific journals where other competent scientists would know how to find it. As for information on who is working in a field or on a problem the present information of the Defense Documentation Center and the Science Information Exchange can be useful, although their coverage might not be complete. Applied research is a different story. Here the laboratory traditions and agency interests dol not favor early publication, and the scientists who tend to break down their assigned problems into small, individual items may not be as aware of the related work of others and thus increase the possibility of undesired duplication. The customs and attitudes of applied research pose obstacles to the ready flow of information. (22)

(22) Donnelly, Warren H., Science Policy Research Division, Library of Congress, Minutes: Highlights of Meeting with OST and BOB, March 6, l969, pp 5. (Attendees: Congress: Charles D. Ferris, Harold H. Rubin, and Warren H. Donnelly. OST: Andrew A. Aines, Robert Barlow, David Z. Beckler, and Charle V. Kidd. BOB: Robert Howard, Hugh Loweth, Glenn R. Schleede, and Lawrence H. Slaughter)
The congressional speakers acknowledged the revision to BOB's Bulletin A-46 the previous month that provided for a list of subject headings by means of which Federal R&D could be reported and facilitated. They also acknowledged that some agencies created ad hoc collections that helped, an example being DHEW-NIH's Population Research Center. On the other hand, they found no information program that would make it possible to determine budgets for programs involving national policies. Aines was asked to organize a PML presentation to brief members of the congressional team about the findings of the PML study team on project -reporting.
What was the result of this meeting? Nothing of consequence resulted, regrettably. BOB did not support OST in adopting the PML report that would have improved agency R&D project reporting, nor did the congressional group seek new legislation or financial support that would have made a difference. Granted that the exchange was worthwhile, but it did not appear to whet the appetite for more of the same.

One member of Congress, Representative Roman Pucinski (D-Ill.) continued energetically to seek what he considered to be breakthroughs in Federal and national STI program progress. His latest effort was the preparation of HR 8809, a bill to amend Title IX of the National Defense Act of l958, whose purpose it was to establish a dataprocessing and information retrieval system to be operated by or supported through the National Science Foundation. For a reason best known to himself, Pucinski thought that he had an informal agreement with NSF to support his bill, and that NSF, in turn, would consider placing the facility in the Chicago area. It turned out that NSF was not in favor of the bill, leaving the Congressman irate. Pucinsi had apparently mistaken Adkinson's politeness for agreement. One would guess that this is how great expectations collapse. (23)

(23) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Weekly Summary, March l5, l969, pp 4.

One of the strong memories I retain involves COSATI interaction with the long-time Director of the Congressional Joint Committee on Printing, Jack Haley. With the support of some members of Congress, Haley had been ruling over his domain with the proverbial iron fist. Over the years he had decreed that the names of authors of technical reports could not be shown on the front cover. His reasoning apparently was that he did not want them to feel too important. He set up other ground rules that did not ride too comfortably with the growing number of scientists and engineers in Federal employ or working for government contractors, including national laboratories. Because the agencies worked with him and his office on a one-to-one basis, they were not able to reach what they considered to be equitable agreements. I decided that one way to change the odds was to ask him to meet will all of the COSATI members at one sitting. He agreed. We met and aired our views in a fairly amicable manner. Weeks later, OST received a letter taking us to task because we seemingly had authorized the Federal agencies to place the name of authors on the front page of their technical reports. Our response was that he had given us this authority during our meeting, but insofar as other deviations from JCP instructions were concerned, the agencies were informed that they would have to get permiossion on a one- to-one basis from Haley. Wherever he is, Haley probably feels that we "pulled one" on him. On the other hand, Federal agency information managers probably still feel that JCP, with or without Haley, interferes with their operations by means of antiquated printing and binding regulations that logically should be a responsibility of the Executive Branch of the government. (24)

 (24) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Science Communications and the Week, March 8, l969.pp 4.

While we were having difficulties in getting the COSATI national systems approach into being, the National Systems panel came up with the proposal that four Federal agency special-area information systems then in operation be recognized as core national systems capable of serving a national community of users in their defined subject areas. The agencies were as follows:

National Agricultural Library
National Library of Medicine
Atomic Energy Commission
National Aeronautics and Space Administration

Under this proposal, they would be responsible, in turn, for serving a national audience, as well as their own agencies, for agriculture, biomedicine, nuclear energy and aeronautics and space information services. The four agencies already serve a national and international user community. It follows then that there should be formal recognition of their well received function as the process of internationalization of data banks develops.

At the same time, the National Science Foundation would continue its role of providing broad-gauge planning, encouragement and support to professional societies in t eir development of discipline-oriented information systems which cut across agency mission areas.

The action paper went on to explain that the purpose of the proposal was to ensure that agency systems can develop or expand with minimum duplication of holdings, coverage and services to users, maximum compatability, and establishment of standards, when needed. Thus, the effectiveness of the growing networks, and overall economy of effort will be improved. Information networks in other agencies were
 expected to make the same transition at a later date. Additionally, agencies were called upon to cooperate with privately-sponsored information systems in existence or under development.(25)

(25) Rossmassler, Stephen A., Executive Secretary, COSATI, Memorandum for COSATI members and observers, Subject:Proposed Action Paper for Four Federal Agency Special-Area Information Systems, March l0, l969, Cover letter and Action Paper pp 9.

It should be pointed out that the action paper received the concurrence of the effected agencies during the process of preparation and that changes were made in the document to satisfy the agencies involved. The Office of Education expressed its interest in submitting its plan for an Educational Information System derived from its ERIC system. Rossmassler estimated that about l5 de facto national information systems that could be the nucleus of the system were either in operation or under development. (23)

The OST staff was greatly encouraged with the prospect of obtaining increased approval from higher authorities in launching some of the national systems plan elements, especially the designation of responsible agencies, a course of action that would hardly do more than formalize what the lead agencies were already doing in their fields of interest. Regrettably, this did not come to pass. The problem continued to be the lack of support in providing OST with additional staff. This is a case where there could have been foward movement without the need for substantial new resources. Designation of responsible agencies would not have required more OST staffing.

Stewardship Reviews

While certain agencies were making progress in their STI system development, there were still many deficiencies that called for improvement. The OST stewardship reviews of individual agency programs were undertaken to rate their STI performance. During this period, several agency STI programs were reviewed by OST personnel. Here is a brief report of two DHEW program reviews.(24)

During the week, two stewardship reviews were held in the Office of Education and the Consumer Protection and Environmental Health Service of the Public Health Service. Impressions: Good work is going on in the Educational Resources Information Center Program. There are now l8 ERIC centers located in U.S. universities. These were established with considerable effort and dedication. Better internal communication and information- sharing are needed. Policy seems to be lacking, also "how to" directives. Interaction with other DHEW programs of interest is deficient. Regarding CPEHS programs, good results are being obtained, especially in FDA, but here again, it is evident that the lack of a central DHEW STI coordinator is permitting STI groups to run off in all directions. This can be seen in abstracting services. in audio-visual programs, and in obtaining translations. (24)

The review of the National Library of Medicine brought different results. Both the library and the Lister Hill Center, the latter being under the direction of Dr. Ruth M. Davis, revealed energetic leadership. Dr. Tom Kennedy of NIH chaired the rest of the presentations. These consisted of samples of STI programs carried out by the Institutes, , examples that accentuated positive contributions only. What was missing were broad and inclusive reviews revealing functions, funding, planning, supervision and coordination with other groups. This lack of organization and planning was noted by Dr. Cummings, independently. Here again the OST examiners found evidence of the failure to institute total program planning, management and coordination by a top level NIH official. While no hard data revealing the cost of neglect were sought, it was plain that there were some unnecessary costs to DHEW and to the taxpayers. (26)

(26) Aines Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Reflections on the Week, March 22, l969, pp 4.

Yet another review of a DHEW information group was undertaken, this of the Health Services and Mental Health Administration. The lack of coordination was quite evident. The Regional Health Program "seems to be going in all directions simultaneously. It is duplicating some of the NLM programs, without making an effort to coordinate and check with NLM. The DHEW front office seemed to be unaware of this situation. The person making a presentation on R&D programs came totally unprepared to give a coherent picture of what his organization was doing in the STI area," according to the report.(23)

A visit to the Defense Documentation Center. An assessment was made that the management of DDC was good if not creative, but the overall program suffers greatly by not having anybody in ODDR&E to provide policy and ride herd on it. The report pointed out that "There is some question about the value of the work being done in the DD l498 (work project reporting) area, largely because the three military services, while providing input to DDC, continue to use their own R&D management information systems.(23)

A stewardship review of the Office of State Technical Services, Department of Commerce, during the same period, was aborted, because it was found that the budget of this operation had disappeared.(27)

(27) Aines, Andrew A., OST., Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Highlights of the Week, March 30, l969, pp 3.

These stewardship review findings were not much different from those undertaken at other agencies. While there was a considerable amount of progress being registered in COSATI and some of the Federal agencies, there was a lopng way to go

to get significant management improvements within the agencies. Most of the blame is placed at the feet of the R&D managers, rather than the STI managers. During these early days, the notion of information resource management was not well defined. Although most of the R&D leaders were scientists or engineers, they were not comfortable with modern information programs and practices, hence most of them, including their deputies and staffs had difficulties in interacting with the STI managers. Periodic reports were rarely required and just as rarely did the agency STI manager find himself invited to the staff meetings of R&D heads. This misreading of needs had much to do with the lack of maturation of agency STI programs. Of course, there were exceptions. In the early years, the head of NSF`s Office of Science Information Service interacted closely with the NSF director. DOD's Director of Defense Technical Information had close relations with his superior, but this was a special case, since two of his immediate superiors, Admiral Martell and General Ely, were successively. chairmen of FCST's COSATI. Since the FST members had to agree on COSATI recommendations, there was the need for interaction between the agency STI manager and his superior. This began to dwindle in later years, because increasingly, the designated agency R&D managers sent their subordinate officers to the FCST meetings in lieu of attending themselves. This resulted in widening the gulf between senior R&D and STI managers even more.

International

If there was ever any question about the contributions of individuals in achieving progress, it is put to rest in reflecting on the contributions of Dr. Harrison Brown, Foreign Secretary, National Academy of Sciences. In his role of foreign secretary, Brown had considerable interation with
the international Congress of Scientific Unions (ICSU). He also identified with UNESCO on a variety of matters. Brown was familiar with a Pugwash recommendation made a few years earlier for a world science information system. Attracted to this possibility, Brown took over the leadership of an ICSU-UNESCO effort, the Central Committee to Study the Feasibility of a World Science Information System, enlisting Dr. Burton Adkinson, NSF, amd others on both sides of the Atlantic Ocean to work with him. From the start, Brown's policy was to keep OST informed about what he considered to be a promising program. Brown, who was aware of the COSATI national systems programs, wanted us to know that his approach was to develop a useful international system serving the needs of the scientific community, rather than trying to design an ideal information network. He also recognized that while all countries would gain through the existence of such a network, it would be the developing countries which would gain the most. (24)

For several years, the United States opted for an international nuclear energy information program. Such an organization came into being in March l969, when the International Atomic Energy Agency, located in Vienna, announced the creation of the International Nuclear Energy Agency (INEA). The system would be operated by INEA and the member countries of this international body. This development delighted the U.S. Atomic Energy Commission, since the system required that each member state will scan its own literature, identify articles of interest on nuclear science and technology, prepare a complete bibliographic description and a summary, and assign keywords from a standard list. Magnetic tape and microfiche would be used to transmit the information to scientists and engineers. Over the years, the United States has contributed nuclear energy information and funds to support this agency. (23)

In the telecommunications area, the process of establishing the International Telecommunications Satellite consortium encountered a tough problem, how to agree on the future management structure. There were now 8l countries in the combine, which made magnified the difficulty of obtaining consensus. Aines discussed this problem in a memorandum to Dr. DuBridge, and expressed the view,"I see the need for a good solution to this difficult problem we are facing. In the long pull, I doubt if U.S. dominance is feasible, even though U. S. hegemony would probably make for a better system technically. Perhaps one approach would be to take the profit motive out of the system, a suggestion that would not be viewed with favor on the part of those who own stock in Intelsat. 26

One of the most honored scientist-educator,who became deeply involved with modern information systems in the l960s, was Professor Sune Bergstrom, University of Karolinska, Stockholm, Sweden. It was Bergstrom who cooperated closely with Dr. Martin Cummings *Director of NLM, in bringing MEDLARS to Sweden. Bergstrom visited OST during the late l960s. During the discussion, he delivered a few of his insights that we found interesting. His university was not only using MEDLARS, unlike NLM, it was charging for the service (about $60. a year) and was encouraging NLM to do the same in the United States. Although Sweden is not enamoured of the foreign policies of the U.S.Government, it does appreciate its open information-sharing policy. Sweden's dominance of the other Scandinavian countries, linked by a joint STI program, is attended by friction among them. The same is true within Sweden itself, where there is considerable friction between factions. (26)-.

Private Sector Interaction

For a number of years, universities located in or near Washington, D.C. had developed schools, graduate and undergreaduate, devoted to higher education in computers, libraries and information arts and sciences. When they became aware of the OST-COSATI information programs, they asked for briefings and interaction. After meeting with one of the university deans, we decided that they should all have equal access. Dr. Lee Burchinal, Office of Education, was asked to participate. For a reason unknown to us, they were a good audience, but showed considerable reticence in airing their views. We wryly concluded in our post-meeting discussion that it would be best to interact with them individually in the future rather than as a group. (24)

Because of his interest and willingness to help COSATI, Dean Paul Wasserman, University of Maryland, was asked to join the COSATI Panel on Education and Training, along with Dr. Dwight E. Gray, American Institute of Physics. The latter, a former official at the Library of Congress and a highly respected information scientist and physicist, possessed one of the keenest minds in the information field. His contributions to COSATI and the STI community deserve a belated salute. (24)

On a number of occasions, OST was asked to be a protector of the private information sector. Rarely did OST turn its back on such requests. One issue arose that forced us to take a neutral stance; this was a request from Earl P. Bassett, chairman of the National Microfilm Association. Mr. Bassett felt that authorities in the Office of the Secretary of Defense (Installations and Logistics) were pressuring the manufacturers of microfilm cartridges to standardize their products, an act that would be costing these firms a considerable amount of money. Bassett was informed that OST would not take a position on this matter. In an aside to Dr. DuBridge, Aines reported the incident, but added his view that he was sympathetic to the DOD officials who brought the issue up, because it was costing DOD and other large This was costing microfiche users dearly because the manufacturers were all using different sizes of cassettes. Fortunately, the problem disappeared with the passage of time. (26)

Another characteristic problem arose in connection with the Counterinsurgency Information Center, which was associated with American University, one of the ll3 information analysis centers supported by the Federal agencies, this one by the U.S.Army. Apparently, the Center was then being reviewed by GAO and had been instructed by DOD to start levying user charges for its services. The problem was that the center, at that time, was receiving very little attention from the Army or from ODDR&E under whose directive it was operating. It was not authorized by dint of its special assignment to serve other groups, thus found itself in a "Catch 22" situation. This problem was pointed out to DOD authorities, with the suggestion that they review the need for this center or take steps to utilize more fully its services.(26) At the time, the post of the Director of, Defense Technical Information was vacant, but the designee, Walter Christensen was contacted and a promise was made that such issues would be given attention in the future. (27) One of the issues involving DOD was discussed with Brad Leonard and Bob Howard, both DOD budget examiners. This was the lack of action in implementing the study of the DOD STI program, which was referred to as the Raymond Report. This study was requested by the Defense Science Board a year or two earlier. It revealed a number of deficiencies of the DOD STI program and called on ODDR&E to take rapid action to remedy them, It was agreed that the incoming Director of Defense Technical Information should be given the opportunity of making needed changes.(24) There was agreement that the DOD stewardship of its STI program had deteriorated significantly since the departure of Walter Carlson. In a meeting with Walter Christensen, who had eventually become the Director of Defense Technical Information, he agreed that this was an accurate assessment and that the dollar cost, though incalcuable, was probably great and "that if improvement at ODDR&E and the military services was not quickly evident, there would probably be a council of war with some of the top executives at the Office of the Secretary of Defense."(31)

(31) Aines, Andrew A, OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, The Events of the Week, 5 April l969, pp 3.

The departure of William Knox to join McGraw-Hill Publishing Co. as a vice president made it possible for OST to engage the growing private information sector in discussions of mutual interest. Knox was in the process of forming the Information Industry Association, which sponsored a meeting of government and private sector leaders in New York City early in l969. A former FCC commissioner, Lee Loevinger, talked about information as a national resource. The president of the Association of Stock Exchange Firms, Lee Kendall, who stated that the future of the New York Stock Exchange would be based on its success in establishing a new information system. George H. Kieswetter, GTE Laboratory, called for more functional information systems than were then in being. Robert G. Krupp, New York Public Library, announced that his facility would be out of room in two years. C.E.Wilson, Nestle Company, called for a better program to educate heads of organizations in the uses and abuses of information programs, pointing out that it is information only when it reduces uncertainty in decision-making. Lawrence Berul, Auerbach Corporation, saw the need for generalized software that can be sold to a number of customers, thus reducing the cost for all. Dr. Robert Cairns, Chairman of SATCOM, made a short talk on the contents of the SATCOM Report which was to be made public in the near future. Bill Knox called on the government to transfer some of its information efforts to the private sector, but he did not spell out what he had in mind more

specifically. The government officials expressed appreciation to Knox for calling the meeting and wished him and IIA good fortune in the future.(26)

COSATI MATTERS

The Library of Congress has broken with its "ink on paper" tradition by organizing a national committee to study the problem of computerizing all of its holdings in the future. Aines and others serving on the committee argued strongly that only new information should be considered for this treatment and when this is done, some day in the future, only then should there be plans to computerize selectively the holdings of the Library of Congress. He further pointed out that the Library was already engaged in a microfiche project, thus it could wind up with three banks of the same information on paper, on microfiche and in computers.-This was an invitation to add to the information explosion. There was probably some justification for this during a trans itional period, but certainly not thereafter. (26)

All to often in their zeal to solve one problem, government agencies find themselves creating yet another. This was evident in a report from Colonel Currie Downie, USAF, who discovered that the Air Force Counsel-General had decreed that the incoming Secretry of the Air Force, along with the Assistant Secretary of the Air Force for Research and Development, should give up their professional society membership in IEEE because some day in the future the Air Force might support an IEEE conference. It is doubtful that the two individuals involved paid any attention to the edict made by the general counsel (23)

Further recognition of the key role being played by COSATI came when Dr. Fred Seitz, president of the National Academy of Sciences appointed his special assistant, Dr. C.E. Sunderlin, to be his observer to COSATI (23)

Members of Congress were beginning to understand more fully that the use of computers in the future would bring a host of new problems. OST was one of the ports of call during the l960s to gather insights in this area. For example, Walter Hahn of Senator Case's office discussed with Aines the subjects of software, hardware, and the privacy of data processing, particularly when online information services would become practical. In the same report to Dr. DuBridge, Aines wrote:

If a scant l0 years ago, a thoughtful observer of the armed forces ha predicted the establishment of an Army data-processing command that would take its place besides regiments and other military units, he would have been regarded as something just short of addle-pated. Yet this week at Fort Belvoir, a few miles from here, the Army has formed a new command, the U.S. Army Computers System Command, to be responsible for the designing, development, testing, installing, programming and system support of its multi-command automatic data processing systems. The unit will be commanded by a general, who will report directly to the Army Assistant Vice Chief of Staff. I venture the prediction that this development will not be uncommon throughout the Federal government. The hunter of Marshall McLuhan is now the computer. (27)

"The electronic Age is once more the age of the
hunter, only now it is the hunt for information, for data."(27)

(27)--Marshall McLuhan, Technology: Its Influence
on the Character of World Trade and
Investment, U.S. Dept. of Commerce,
 Washington, D.C., November l966.

COSATI as a Stimulator of Thinking about Communication

One of the contributions made by COSATI during its hey-day was its stimulation of thinking of scientists and others about science communications. In reality, there was not much thought being given to the subject by the rank-and-file scientist and engineer. Perhaps this accusation is still true today. When the COSATI community undertook a series of studies in this area in the late l950s and l960s, few scholars were writing about science and its communication.
Derek De Sola Price was an exception, so was John Ziman in England, but even these scholars focused little on the phenomenon of the unrefereed technical literature that was literally exploding in the United States, the subject of COSATI's concern. One perceptive scientific publication that did reflect on the subject was U.K.'s Nature.(28)

(28) Author unnamed NATURE, Review Supplement,The Shadow Literature, Volume 222, April 5, l969, pp 39-40.

Here are a few excerpts:

...because of the way in which publications mayfrequently help in strengthening a person's claim on money or even promotion, it is not surprising that the integrity of scientific literature is jealously watched over by most working scientists. This is why it is inevitable that a good many thorny issues should have been raised by the study of some of the peripheral parts of the literature, and in particular the technical reports produced by public and industrial laboratories, which has been carried out by the Committee on Scientific and Technical Information (COSATI) in the United States...What the COSATI committee has been concerned about is the relationship between the growing collection of technical reports and what may be called the scientific literature proper.....What seems now to have happened is that COSATI has been impressed and a little frightened by the tensions which exist between the scientific journal and the penumbra of less regular publications which surrounds them The report does more than a little to suggest that the avidity with which authors publish in their regular journals is not always matched by the enthusiasm with which readers read what has been written. It is earnestly tobe hoped that journals will take more seriously to heart than in the past the importance of other channels of communication than formal publication in the journals....The COSATI committee threading its delicate compromise between the conflicting interests of journals and technical reports, does argue that the sponsors - usually governments - should pay more attention to the quality of technical reports and asks that dissemination should be an explicit responsibility of the sponsoring authorities.

The article concludes with these comments:

Too many of the journals have become archival and too few of them remain readable. With scientific journals as with technical reports, puiblication has come to seem more important than communication. In the decade ahead, some other COSATI committee and its counterparts elsewhere should pay some attention to the problem of how to make the journals more suited for the process of communication, which should, after all, be their function.

As seen by the anonymous NATURE reviewer, COSATI's contribution was that it reminded the science community that it was no longer the sole performer in the central ring of the science communication circus and that it should be more concerned with the readability of its products. Unfortunately, because it really did not track all of what COSATI was doing, it failed to recognize that COSATI was a force for ushering those involved with science communications into a world of databases, networks, and personal computers. In general, the science community has not paid much attention to COSATI's contributions, nor to NATURE's wistful recommendation that they show more concern in their journals for communicationability

Another thoughtful article that may or may not have been infuenced by the direct or secondary effects of COSATI was an article by W. Kenneth Richmond, Glasgow University.(29)

(29) Richmond, Kenneth W., Senior Lecturer, Department of Education, Glasgow University, The New Media: The End of Literate Man,Chemistry in Britain, Vol. 5, No.4, April l969, l page.

Richmond acknowledged that his title might seem to be unwarrantably sensational, but it does proclaim a sober truth that all should ponder. For the past four centuries books have been the main vehicles for the dissemination of information and ideas. Now the monopoly enjoyed by print is rapidly breaking down under the impact of modern media usage
What is less clear is the nature of the implications of this transfer from a print-dominated to a multi-media culture. The author writes:
.
Like it or not, there is a built-in, unescapable law operating in all technological advance. First, instrumentation alters orientation., Second, instrumentation alters styles of presentation. Third, instrumentation alters the learning situation itself. More simply said, it means that a man who has to rely on Shanks' pony for getting around has a range of action much more limited than the man who has a bicycle, a car, a plane, or a space vehicle at his disposal. In each case, what he can do is determined by the instruments available. The teacher who uses a language laboratory soon finds that it is no longer a case of business as ususal in the classroom. The learner soon finds that getting information from books is not the same as getting it from radio, films or TV; and sooner or later comes to realize that the learning experiences he got from looking and listening are in some ways more powerful than those derivable from the scrutiny of cold print. Thus, there is an observable trend from 'literacy' to `oracy' for the want of a better word. Associated with it is a second trend from 'literacy' to 'numeracy.' Ever since Rousseau's premature protest in the l8th century, ("I hate books: they only teach us about things we know nothing about!'), there has been a growing distrust of language.

 The author then discusses confrontations between Matthew Arnold and Thomas Huxley, apostles of the literary intellectuals and natural science, respectively, also the later day debates between Snow and Leavis, which cast doubts on the efficacy of the artes liberales and the supremacy of an education based exclusively on " words, words, words." Richmond

goes on:

This is not to say that reading will cease being a basic skill or that we are moving into a post-literate phase of culture where books will disappear,...It does mean that the man who is content to rely on books alone will be limited to foot travel in an age of jets. ..The end of literate man is not a nightmare conjured up by thewriters of science-fiction.The word 'end', after all, has two meanings: finis and destiny. The destiny of modern man is to move on from literacy, to avail himself of an educational technology which opens up the prospect of amplifying intellectual powers as dramatically as machine technology has amplified physical power.

Richmond's views are persuasive and fairly well reflect those of contemporary information scientists and other scholars who recognize the changes that have resulted from the arrival of new information technology. What the rank and file scientists sometimes fail to understand is that the new information technology has dealt science communications a new hand, and at least one of the cards in this new hand gives them powerful new tools to gather, handle, store, retrieve and disseminate scientific and technical information, but another of these cards has ordained that the science communications process become `institutionalized'. In simple terms, the community involved in science communications has grown to include the planners, organizers, and tenders of a greatly enlarged information apparatus, using the latest information technology. This is an extraordinary step forward in the annals of science and technology, one which opens up vast new opportunities for progress. Unfortunately, the leaders of government research and development programs have not accepted this reality in most instances, hence at least one of the conditions that increasingly will be involved in highly successful R&D accomplishment - the fashioning and creative use of finely tuned information systems - has not been perceived as a high priority by the leadership, both R&D and political.

During the mid-l960s, hopes were not only high for greatly inproved Federal STI systems, leaders of the discipline-based systems were also riding high on a cloud of expectation as they took steps to upgrade their operations. Dale B. Baker, director of the Chemical Abstracts Service, the information arm of the prestigious American Chemical Society, wrote

Since early l968, OECD, which includes the western
European nations, Canada, Japan, and the United States, has been encouraging cooperative experiments between CAS and information centers in member nations. To date ll nations are involved in some degree of activity under this program. UNESCO and ICSU are sponsoring still other studies toward the goal of a world-wide STI system. though a world-wide network does not exist and will not immediately come into existence, such a system is obviously essential to the continuing growth of science...Fortunately, the capabilities of modern electronic data processing technology have provided at least a partial solution to this formidable information-handling problem. During the last decade, the CAS, with the financial support from the National Science Foundation and other Federal agencies, has been developing a computer-based system...What is emerging is an integrated systrem designed to speed the flow of chemical information and minimize the human effort
to process it.(30)
(30) Baker, Dale B., Director,Chemical Abstracts Service, World Information Network Taking Form: U.S. System Well on Way, Journal of Commerce, April l4, l969. pp 5 and 7.,

NSF Hearings Before Daddario's Subcommittee

During the hearings of Daddario`s House Subcommittee on Science, Research and Technology (check name), on the NSF program, William T. Knox, McGraw-Hill, testified at his own request. He proposed that NSF increase its support of the private sector*in its STI research support programs, also to give the private sector an an   an increased voice in the total national picture. When pressed to describe what*what** the**private sector might do in the national system area, the answer was swer wasindecisive, bringing the wrath of Congressmen George Miller and Emilio Daddario. This, in turn, angered Knox, who privately declared to Aines that he would continue to persist.(3l) The persistence was not in the form of specific proposals, which was what the congressmen were after, but in increased efforts on the part 0#0#of the Information Industry Association generally. I thought that it was sad that Knox, whose contributions to the Federal STI program improvement were so many, would find himself at odds with the two congressmen. (31)

SATCOM Report Discussion

Dr.Robert Cairns, Chairman of the NAS-NAE Committee on Scientific and Technical Communications (SATCOM) and William Knox asked for an appointment with Dr. DuBridge to discuss the completed SATCOM report. Because DuBridge was unfamiliar with the genesis of the report and the OST-NSF involvement throughout the period of the study, Aines prepared a paper providing both information and opinions about the report. (32)

(32) Aines, Andrew A., Memorandum to Dr.Lee A. DuBridge, Director OST, Subject: Notes for Meeting with Cairns and Knox, April 4, l969, pp 2.

In summary, SATCOM wants to create a permanent STI group within NAS-NAE to formulate national and international STI policy and advise the government generally in this field. Funding for this effort would be a chancy thing, since the SATCOM effort cost NSF over $300,000 over a three-year period. Since NSF does not like to support continuing programs, it is doubtful that more funds would be found to support the new entity and at the same time increase funding of professional society programs called for in the SATCOM report. Laced through the report is a series of statements that may be interpreted by some of the COSATI members as being anti-government and favoring the private sector. We have not yet received NSF`s views on the report, thus ought to wait until we obtain these comments along with those of the Federal agencies that would be affected by the study.

Nothing appeared to have happened as a result of the DuBridge-Cairns-Knox meeting, but on reflection many years after the episode, there might have been more progress if Dr. DuBridge showed more interest in the study. Even an abbreviated program at NAS-NAE might have kept American scientists involved in the search for improved Federal and national STI programs. On the other hand, there appeared to be no spontaneous interest on the part of scientists to push ahead without government funding, even though they would be the group primarily rewarded by improved Federal and national STI programs. The puzzle still continues.

Office of State Technical Services
During the Spring of l969, it became apparent that OSTS was going to lose its funding. Word came from colleagues in BOB that the incoming Secretary of Commerce, Maurice Stans, had volunteered to withhold the funding of this increasingly popular joint Federal-State program for reasons that were never explained to OST. In contradiction, the Commerce staff claimed that it was BOB that wanted DOC to produce proof- positive that the benefits already obtained from this program have out-weighed the costs. When the States rose up to protest the unilateral termination of funding - their matching funds had just about caught up to the Federal investment - Stans agreed to abide by the findings of an A.D. Little Co. fact-finding appraisal of the OSTS program, but he did not reinstate the funds needed to operate the program. As expected, the A.D Little report came back with a clean bill of health, but it was too late to obtain the requisite funding and the under-nourished OSTS died.(31)
A meeting was held with Dr.Myron Tribus, the new Department of Commerce director of science and technology on the subject, but it was too late. He was also informed that there was dissatisfaction in COSATI about the lack of continuing Department of Commerce representation in that body. Aines pointed out to Tribus that some of the agency's STI programs were less than satisfactory, giving him the example of the agency's environmental services program which was limping along with sub-standard STI management. Tribus promised to look into this problem when "he got his feet on the ground." There was a period of time when the Department of Commerce's representitive to COSATI was Dr. Donald Schon, a very bright and aggressive engineer. Schon had both drive and authority, hence was successful in his stewardship. Another reasonably successful person was Dr. Edward Brady, National Bureau of Standards, who helped create the National Standard Reference Data Service, but because he did not come from the Commerce Department's front office his authority was somewhat limited as compared to Schon. However, Brady, who became the representative to COSATI early in l9069, was an excellent thinker and doer in COSATI for a number of productive years, until he took over the NBS international program. He was sorely missed thereafter.
Review of OST-COSATI
After he had been in OST for a few months, DuBridge asked,, "Why is OST in the science communication business?" Since he asked the same kind of question to all of his program heads, there was no real alarm. He was reminded of an earlier presentation on the subject, which was unfortunately foreshortened because of the intervention of a mini-crisis. He was also reminded of the briefing given him by his predecessor, Dr. Donald Hornig, on the subject. I made the suggestion to him that he bring together a very small but knowledgeable group to review the program, its attainments and its failures. I suggested a number of people who he might consider as members or as potential chairmen of an ad hoc group that would provide honest and objective advice. Also made clear to him was my willingness to either depart or shift program gears whatever course he chose. Oddly, this was the last I heard on that subject. I thought about it later: either he was satisfied with the program and my response or he had discussed the matter with others and concluded that the program should continue. (33)

(33) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director OST, Subject: Proposed Ad Hoc Review of OST-COSATI Information Programs, April 9, 1969, 1 page.
Stewardship Review
One of the most satisfying presentations on its program was made by ESSA representatives, who fully recognized that their agency was in fact a large scale information program, but their major problem was the huge volume of data that they had to

handle. The result was that they realized that they were not "mining" the data as efficiently and effective as they should have because of the lack of analytical capability. Their input was global in scope, and they believed that all things considered the system worked and that other countries were carrying their load insofar as information-sharing was concerned. They recognized that their operation was not a key Department of Commerce concern, hence communication with the Commerce COSATI representative was not as good as it should be. However, the deep interest that Brady possessed for and with scientific data was a good omen, it was felt, for closer interaction with ESSA. But it was realistic to admit that the notion of an agency-wide STI program in the Department of Commerce was far from popular. The same could be said about STI programs in other agencies, especially the older ones, where there were strong and competitive components, which preferred the maximum of independent action. The Department of Interior was an example of this problem, where strongly entrenched components resisted the involvement of a central, non-managing information program (34)

(34) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director OST, Subject: Week in Review, April l3, 1969, pp 4.

International-OECD

Returning from an OECD meeting in Paris in April l969, Aines reported that the OECD Information Policy Group was still finding it difficult to rationalize and employ its Economics Panel. In the two and a half-years of its existence, the only product it has turned out was one study report on the subject prepared by the Studiengruppe of the University of Heidlberg, and part of another being undertaken at the Uni#versity of Edinburgh. The committee members were anxious to obtain a list of costs of STI-handling in the various countries. U.S. figures were already made public by means of the NSF statistical series, Federal Funds for Research and Development. The OECD members made it clear that their countries would probably not unilaterally make STI funding data available, but might if they were asked to do so by OECD. One of the interesting efforts of the OECD Information Policy Group (IPG) was its series of appraisal-reviews of the STI programs of member countries. Several country programs had been examined in recent years and at this meeting both Canada and Japan invited OECD to schedule an examination of their programs. There was a good reason for the eagerness of the inviting countries. After each study, the key leaders of national R&D programs would be invited, along with the information managers, to attend a presentation by the IPG team, covering their findings, their recommendations and their comparisons to the STI state of the art in other OECD countries. It was through the exercise of this mechanism that progress might be possible within individual countries. Each IPG member was expected to give a brief summary of STI programs, problems and plans. For example, the German representative reported that information networks were being considered for geology, law and patents. A chemical information program was being supported by the German government and the Max Planck Institute; an information center for social science was being established, and a five-year governmental STI plan was being formulated. The Canadian representative announced that his country was working on a telecopying program to transcribe STI all over Canada and there was a move to fashion construction industry and urban information systems. The British representative told the meeting attendees that an institute had been formed to work on technology issues, and that a major reorganization has brought the Office of Scientific and Technical Informtion (OSTI) and various national libraries together to bring more centralization to the national effort. An observer from the Common Market stated that his organization was formulating a common policy on science and technology, including STI, and considerable attention was being given to information systems in agriculture and metallurgy. The OECD Panel on System Interconnection and the Panel on Technical Information for Industry provided status reports. These reports and programs were characteristic of what was taking place in the IPG Committee. There is no doubt in my mind about the usefulness of this international STI operation to all participating countries as long as it lasted, although it was getting more and more difficult to get Federal support to send a U.S. representative during the early l970s. The failure of OMB and agency heads to fully support the OECD IPG program during that period was galling, a shortsighted attitude that cost the United States prestige, influence, and valuable information. (35)

(35) Aines, Andrew A., OST. Memorandum to Dr. Lee A. DuBridge, Director OST, Subject: Summary of Trip Report, April 21, 1986, pp 4.

A Proposal for a National Center for STI

Periodically, I would recommend the establishment of a new Federal information center calling for the combining of the Clearinghouse for Scientific and Technical Information and the Science information Exchange. The arrival of Dr. Lee A.DuBridge gave me another opportunity to try again. I wrote, in a memorandum:

Earlier efforts to develop an effective interagency project-reporting system have had only partial success. Some elements of a potentially compatible system are being developed and maintained in several agencies: DOD, NASA, Commerce, and Agriculture. The Science Information Exchange, with some 90,000 projects registered, provides limited project informtion to a wide range of users, but unfortunately has not been able to adjust to agency needs, the basic reason for SIE's existence. The CASE System (project data on academic research programs) does not receive all of the agency data it requests, nor is its output completely useful. This is detailed in the PML report. An ideal system would include: a file of reliable, up-to-date information on a wide range of subjects; ability to deliver on request all revelant information in queried fields; capoability of helping research managers perform their functions including screening of work projects to reduce the likelihood of duplication; provision of "one stop" service that covers results of completed work as well as current efforts; and maximum decentralization of data banks with efficient central coordination to assure functional efficiency of the system.

Under OST policy guidance and coordination, an effective government-wide system can become a reality, resulting in an organized way to provide data on current projects, completed research, human resources, facilities, geographical information, equipment resources and the like.

The Director of OST should announce the establishment of the National Center for Federal STI; request agency cooperation in the development and operation of the center; form an Interagency Task Group to monitor the program and ensure proper agency STI input to the National Center; announce OST's intention to provide policy direction to the center; and arrange with the director of BOB to issue a circular describing the function of the center and the responsibilities of agency heads in making it work.

Regrettably, nothing came of this proposal; it simply did not have a high enough priority to get further action at the time. (35)

(35) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Proposal for a Government-Wide Research Information System, April 25, 1969, pp 4.

DOD and Security Information

The president of Carnegie-Mellon University, one of the nation's centers of research and advanced industrial policies, Richard M. Cyert, in a recent article dealing with the erosion of U.S. knowledge has conceded that "the competitive importance of the U.S. research establishment must be recognized.(36)

The United States in my view, is an analogous position to being on the frontier in colonial times. We are really fighting for our economic life. Unless we are able to do some things in universities to help in this, I think our whole standard of living in this country is going to go down the drain.

Cyert went on to say that he would be willing to consider a proposal that would boost federal research support for American universities - with the requirement that the research work would be restricted to U.S. citizens but:

One of the great accomplishments of the United States has been the dissemination of its knowledge around the world, (but) we want the bucket to leak. We do want the stuff out there. To the extent that we can hold back a little bit, say by some restrictions on licensing, or on access to the most up-to-date (research), it would give us a little bit of a comparative advantage.

Cyert's views are not shared with the presidents of other prestigious universities, most of whom stoutly advocate the elimination of barriers to the free flow of technical knowledge with few exceptions.

(36) Behr Peter, Plugging the U.S. Knowledge Leak, Washington Post, October l6, l986

It is interesting to that the problem is antique in nature. In a memorandum to Dr. DuBridge, Aines wrote in l969:

DOD continues to go through a bad period, caught between the battle of the information release hawks and the (protection) doves, who are located in Congress and in DOD as well. A study has been going on for a long time, as previously reported in my weekly reports, by means of which DOD hopes to come to a position of accomodation. I am informed that some of the universities are becoming restive about restrictions as well On March 4, l969, Mr. Laird (Secretary of Defense) issued a memorandum on Public Information Principles to correspondents assuring the American people will be fully informed of matters of national defense, consistent with the need for security. Unclassified material, other than that exempted by the Freedom of Information Act, will be readily available to the press and the people. DOD personnel will not be permitted to classify information solely because its disclosure will result in criticism of DOD.(37)

(37) Aines, Andrew A, OST, Memorandum top Dr. Lee A. DuBridge, Director, OST, Subject: Comments About the Previous Week, April 26, l969, pp 3.

Congress

OST continued to play close attention to what was happening in Congress, as well as interacting with its committees and members, interested in information system development. That Congress was catching the fever was evident. In l969, Congress already had 20 bills dealing with STI and data processing in its mill. Congress at that time was acutely concerned about its comparatively antiquated information-gathering and information-processing functions. Equally, it was interested in knowing more about the many Executive Department information systems being developed: what systems were in place or being developed, their rationale, their costs, the benefits being derived, and how Congress could use the data banks.(37)

During this period, Congress was head over heels in privacy legislation, hence it was not surprising for OST to receive a letter from Congressman Jackson E. Betts, (Ohio), asking for a rundown of its activities and views on the subject of secrecy and information systems. John Farmakides, NASA, the excellent chairman of the COSATI Panel on Legal Aspects of Information Systems, undertook the task for OST. The memorandum also reported that Senator Muskie, who, with some of his associates, was interested in seeing a catalog of Federal Assistance Programs, also contacted OST for information and help. In this case, we asked NSF and NIH to act on our behalf, since only a small section of the catalog would be devoted to science and technology programs. Finally, discussions were held with congressional representatives on the subject of research and development project-reporting, a subject of continuing interest to that body. One result of this meeting was a greater recognition on the part of the congressional staff that research project reports are but one part of the information spectrum pertaining to R&D programs.(37)

National Science Foundation

In l966, Bill Knox had asked the Director of NSF, Dr. Leland Haworth, to increase STI staff support to OST by adding a new Assistant Director for OST together with a six-man staff at NSF. Haworth agreed to this move, if he was given the additional spaces for the purpose. This did not happen, unfortunately. Three years later, Drs. Charles Kidd and John Mays, both of OST, who were tasked by the OST director to propose a new NSF organization proposal, were asked by Aines to add additional NSF STI manpower to enable formation of the OST-STI support unit. This scheme was not implemented when their task was completed, and yet another opportunity to strengthen Federal STI programs was missed. (37)

An OST Misfire

Add ..we were very pleased with....

We were very pleased with the entrepreneural attitude of the COS-TI Panel on Information Sciences Technology and its long list of accomplishments. Many of these resulted from giving the officers of the panel freedom to operate and to push the state-of-the-art forward. One day, much to our mystification, we were sent a copy of a newspaper article, which announced that there was an advanced scientific and technical information retrieval system that was already serving the Federal agencies.(38)

(38)Staff Reporter (unidentified), Wall Street Journal, Subject: Information-Retrieval System Being Offered by Mead, Paper Firm. It States Network that Uses Remote Terminals is Serving Federal Agencies and Others, March 2l, l969, p l4.

The article explained that the data system was developed by Data Corporation, a subsidiary acquired by Mead last May, which has installed a central computer in both Dayton, Ohio, and Washington, D.C. The article went on to say:

(The system) serves customers who wish to store large volumes of data and to have rapid retrieval of the information when it is needed. To request and receive the information, a customer uses a remote communications terminal in his own office linked in the so-called "time-sharing" manner to the central system. Such terminals include teletypewriters and cathode-ray-tube display devices, which are similar to television screens operated by keyboards. With a terminal, the user can request information associated with a key word or words and receive it either immediately on the terminal or, of a large amount is involved, later after the computer turns it out on a high-speed printer.

The article further stated that Mead was working on a project for the information science and technology panel of the President's Committee on Scientific and Technical Information.

As can be expected, the news item was read with amazement and disbelief within OST, since the project was considered an experiment to be undertaken within the COSATI organization, nor had Mead been authorized to make a public announcement on the subject by the project officer. There was obviously a misunderstanding between Mead and the project officer. Fortunately, the news item was not widely read or challenged by persons in and out of the government, but it did reveal the eagerness of U.S. commercial organizations to participate in the future development of databases that were beginning to appear in and out of the government. Also interesting is the description of the move into the database era by COSATI and the private sector entrepreneur. Sad to admit, however, this database created by the COSATI Panel was to be short-lived. For some reason, still hard to understand, this database, which should have been one of the most popular of Federal databases, did not continue to flourish. The Science Information Exchange, which should have given it "tender loving care," showed little interest in sheltering and keeping it alive. One reason for this was a systemic failing of SIE, its custom of treating all databases in the same way, worrying more about the overall SIE mechanism rather than in the content of individual databases, even those with priorities of one kind or another..

National Science Foundation

There was always a special relationship between OST and NSF and interaction with Dr. Burton Adkinson was always a friendly and often pleasurable experience. OST had great respect for the pioneering work of Adkinson, who was one of the Federal government leaders in the STI field, a respect that was shared by other Federal agencies and the private sector, profit and non-profit. OST with a miniscule staff and even fewer funds was highly dependent on NSF for intellectual and financial support. In one discussion with Adkinson, I asked him what he thought about the union of the Smithsonian Science Information Exchange, then being supported by NSF with some misgivings, and the Clearinghouse for Scientific and

Technical Information, being operated by the Department of Commerce. The objective of the merger was to provide "one stop" service for users interested in obtaining information about both Federal ongoing and completed R&D projects. Adkinson stated that he was generally in favor of such a change. The problem, we both agreed, would be to decide which Federal agency should be responsible for the combined service. It did not appear that Adkinson was interested in taking over this new function, smarting as he was about his problems with Smithsonian Institution and the Science Information Exchange. We also talked about a project that NSF had undertaken a couple of years earlier to inventory scientific journals. NSF had spent more than $150,000 on a contract study to determine the feasibility of such a program. Adkinson stated that the lack of progress should be attributed to the "slowness" of the three national libraries without spelling out why they were delinquent. During the meeting, he also stated that he was having competitive problems with the Office of Education. Both the Office of Education and the National Science Foundation were colliding in their library grant programs. I offered the services of OST for a meeting between the two agencies to establish guidelines that could possibly decrease the competition between the two in supporting library research grants.(39) The offer was accepted and a meeting was held with Dr. Adkinson and Dr. Lee Burchinal of the Office of Education. The result of this meeting was an agreement between Adkinson and Burchinal to coordinate their library grant programs in the future.This was another example of OST's involvement in productive coordination of agency programs. It also reveals OST's interest in overall Federal research and development matters rather than only in information dissemination that now seems to be the current preoccupation in the Federal STI area.

(39) Aines, Andrew A., Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Commentary on the Week, May 3, 1969, pp 4.

Outlook for COSATI

Late in April 1969, a meeting of the COSATI and its task group chairmen and executive secretaries was held to discuss current and future programs. Aines made a few candid comments about the status of COSATI. Following are few highlights:

An objective review of where we are leads me to state that our record of achievement, while commendable, is not all that it should be. We still remain relatively alienated from our Federal R&D leaders. We lack systems and computer experts, as well as requisite tough minded STI managers. More effort is needed to bring scientific and technical managers, specializing in data, into the fold. We need to be training young people to replace us when the time comes. There are STI areas, other than dissemination, that are crying for our attention, such as page charges, policy formulation, information resource sharing, and others. We must find ways to implement the many recommendations made by high level

STI review groups. A higher commitment for better STI programs by the Federal R&D agencies still remains missing. We should continue to look for better ways to organize and operate the COSATI mechanism. There is no reason to rest on our laurels with so much to be done.(39)

Aines concerns about strengthening the COSATI program were not fully shared by the OST front office, which persisted in asking the question why OST was in the STI business. Stung by the unexpected internal ferment, Aines prepared terms of reference for a suggested OST Panel on Scientific Information and Communication.(46)

(46) Aines, Andrew A., OST. Memorandum to David Z. Beckler, OST Executive, Subject: Panel on Scientific Information and

Communication, May 14, 1969, l page. Attached: Terms of Reference for the suggested panel, pp 3.

Some of the tasks of the Panel were:##To analyze trends in science and technology that would have an effect on supportive STI programs.##To identify and appraise the STI programs of OST and COSATI.##To study the organization of COSATI in relationship to OST, Federal agencies, and non-governmental STI organizations. ##To prepare recommendations to OST for improved Federal and national STI programs, including a list of priorities for immediate and future action.##Also included were a number of questions dealing with specific actions for COSATI, NLM and other organizations.##Not clearly defined in this COSATI rationalization program were the reasons why the exercise was being considered in the first place, except for the recognition that there was a battle for spaces and funds going on and all programs of OST were under review. The OST-COSATI program was so large and complex, calling for all of our best effort, that we set aside any doubts about the merits of the program and continued the overall program of improving Federal and national science communications. We were certain that we were making positive contributions. (44)

Congress

An update of congressional bills and resolutions of interest to COSATI was prepared to keep the members and observers alert to the actions going on in Congress. A few items from the list follows: (40)

H.R. 8614 -- To establish a National Commission on Libraries and Information Science in DHEW.##H.R. 9473 -- To establish (an independent) National Commission on Libraries and Information Science##S. 60 -- To create a catalog of Federal Assistance Programs##H.R.Res. 589 -- Expressing the support of the Congress, and urging the support of Federal Departments and Agencies, as well as other persons and organizations, both public and private, for the international biological program. #
(40) Handout for COSATI members and observers, Congressional Bills of Interest to COSATI, May l969, pp 3.

Opposition to Regulation of Data Processing##In light of recent developments in the communication and data processing fields as a result of the disvestiture of AT&T, it is interesting to look back to the salient findings of the Presidential Task Force on Communications Policy appointed in l967 by President Johnson and reporting in late l968 after a l5-month study. (4l) The key conclusion was that government regulation of data processing was unnecessary because of a belief that "computer utilities will not dominate the market." The task force also recommended that:.##AT&T should be required to interconnect its private line facilities with those of competing carriers.##Within limits, interconnection of the public message system with foreign attachements and with user-provided communication systems should be allowed.##AT&T should be required to buy communication equipment from independent suppliers if they can offer equivalent performance at less cost.##A pilot domestic satellite system should be established, under the trusteeship of Comsat. Building a full scale system should be delayed until this is done.##The FCC should have full jurisdiction over intercarrier agreements, contrary to the views of established common carriers.##The telephone companies should not be permitted to offer data processing services with the exclusion of Western Union. The argument of the carriers that computerized store/forward service is a subset of telephone-type switching was rejected.

(41) Hirsch, Phil, Datamation, May l969, pp 121-122.

One can only wonder what would have been the effect on our present dilemma if the recommendations of the Presidential Task Force on Communications Policy had been implemented in l969. ##More on the National Center for STI Proposal##Discussions were held with the operators and managers of the Clearinghouse for Federal Scientific and Technical Information, the Director of the Science Information Center, the Science Advisor of the Smithsonian Institution, the Head of the NSF Office of Science Information Services, the Commerce Department's Deputy Assistant Director of Science and Technology, and the Assistant Director for Information Programs of the National Bureau of Standards. on the subject of establishing a National Center for Scientific and Technical Information. Because the proposal called for combining the Clearinghouse for STI and the Science Information Exchange to provide faster, one-stop services to information users, as well as to lower the costs of both operations, all of the principals were brought together to discuss the advantages and disadvantages of such a change. #All of the participants were of the view that the notion was meritorious, although there could be problems in carrying it through. Aines briefed Dr. DuBridge to obtain authority and his support before asking for BOB's assistance and support. in getting action started.(42)#
(42) Aines, Andrew A., OST.,Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: National Center for Scientific and Technical Information, May 7, l969, pp 2.

Congress##Congress was going through a period of building its own computerized information services with all of the labor pains that accompany such an effort. For example, there was a proposal to build a congressional data bank, but the debate centered around who should create and operate the utility. Representative Brooks of Texas wanted the General Accounting Office to take on the responsibility. Elmer Staats of GAO concluded that Congress should set up such a program under its own control, but agreeing to do the job if Congress so directed. The Legislative Reference Service had a number of supporters in Congress who recognized that this congressional unit was the most advanced in the use of new information technology, operating a 20-terminal for its own programs. Eventually, the task was given to an information management group within Congress. Aines pointed out to DuBridge that whatever happened in Congress in this area was of key importance to the Executive Branch because it was inevitable that a mature congressional information facility would want to have access to the databases in the Executive Branch.(43)##Another congressional area that was of concern to the Executive Branch dealt with a decision on the part of the Office of Education to stop funding a Library of Congress program dealing with the indexing of Soviet periodicals. It should be remembered that it was common practice for agencies and departments of the Executive Branch to fund special programs in the Library of Congress during this period.(43) Apparently, the days of cooperative programs of this nature were beginning to come to an end. #
(43) Aines , Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director OST., Subject: Some Highlights of the

Week, May 10, 1968, pp 2.

International##From time to time, there were interactions with the French government. On this occasion, OST was visited by Brigadier General Ivan Renaud (French Air Force), Director of the Centre de Documentation de l'Armament (Cedocar), which was much like our Defense Document Center. The general wanted to get our help in upgrading Cedocar's program. I suggested that he send a letter through channels to ask formally for the assistance, which I told him we would be glad to provide. This request never was made, or if it was, it did not come to OST.(43)##Coincidently, the report of the Common Market "Aigrain" task group was circulating at this time. Among 47 projects recommended to the European scientific and technological sector in seven major areas were a number dealing with data processing, communications and information. For example, proposed were a European Data Processing Institute, a joint meteorological center, joint development of weather satellites, a joint European center for the processing and dissemination of STI, and a European library of computer programs.(39) It was never necessary to convince the Europeans, and the French in particular, that the need for first rate information systems to support science and technology were of prime importance. ##OST continued to be a mecca for foreigners with a yen for more information about OST-COSATI information programs. Professor Alfonso Caracciolo di Forino, a consultant, who was charged by OECD to set up a group to study the computer, its languages,and its uses, visited OST to get help in obtaining an inventory of programs in the United States. We told him that this was a physical impossibility, so rapid was computer use growth. Two Canadian information experts, Dr.R.E. Pomphret and Sheila Fraser came to learn more about information systems for solving socio economic problems, as well as promoting technology utilization. While the United States was anything but aggressive in following up on bilateral science exchanges, other countries were not. Dr. John Carstoiu, a visiting scientist from Rumania, met with OST to seek further implementation of the United States-Romania Exchanges Program of 26 November l968, which called for the exchanges of unclassified scientific studies and reports. He was asked to confer with the Federal Clearinghouse for Scientific and Technical Information. (46)#

(46) Carstoiu, John, Visiting Scientist SUNYA, President, International Consultant, Scientists Corporation, State University of New York at Albany, letter to Dr. Daniel F. Margolies, OST, May 20, l969, l page.

International - Library of Medicine##Another chapter in the NLM-Excerpta Medica hassle was written. Dr. Bootcher, the Dutch equivalent of Dr. Lee A. DuBridge, continued to appeal to the Science Advisor and the State Department to take action to help Excerpta Medica. A meeting with Scott Adams, NLM Deputy, resulted in his assertion that "the matter was now defused." A two-person task force was formed, whose task it was to explore ways of reducing costs and solving a few technical problems. On another matter, Adams stated that his organization was seeking an agreement with the Soviets to have them provide NLM with Chinese publications that were still being sent to the U.S.S.R. Work-sharing programs with the Soviets were also being discussed. The meeting ended with a suggestion by Aines that NLM explore the the employment of user charges being "pushed" by BOB.(44)##(44) Aines Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Weekly Review and Commentary, May 17, 1969, pp 4.##International##A meeting was held with Dr. Zvonimir Damjanovic, Deputy President, Yugoslavian Federal Council for the Coordination of Science Activities, and members of his staff. A briefing about COSATI was provided the vistors. Damjanovic asked what we could do to improve science communications with his country. I suggested that his government provide additional support to the Yugoslavian representitive to OECD, Dr. Milan Mole, who was highly respected by the Americans and an excellent focal point for further discusssions about increased STI interaction. A later discussion with Mole during an OECD IPG meeting disclosed that he had no knowledge of Damjanovic's visit and that he had not been contacted by his government to take steps to improve STI interchange. ##Dr. Martin Cremer, a fellow OECD IPG member, who headed the German government STI program, visited OST, and relayed the information that the German government was going to form a new office in Washington, D.C. along the lines of the Scandinavian STI program (SCANDOC) to do a more efficient job in gathering U.S.-generated technical data.(45)##(45) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, OST Director, Subject: The Week in Summary, May 24, l969, pp 4.w###International - American Chemical Society##The American Chemical Society was during the l960s perhaps the most aggressive society in the United States in its campaign to advance chemical information programs on a national and international scale. It was superbly positioned to do so with its record of close teamwork with the Federal government, which had much to do with the modernization of its information program. Milton Harris, chairman of the ACS Board of Directors, agreed to provide OST, BOB, the Department of State, and the National Science Foundation with a presentation of the status of its international negotiations. In summary, he said that there was a positive movement toweards agreements with groups in Germany and the United Kingdom, but the Soviets were cold to overtures. Dr. Richard Kenyon of ACS that it was mandatory that some kind#of a chemical information "world order" had to be worked out.The fuller participation of chemical information users was now necessary. Journal economics were getting out of hand. The move towards mechanized information handling was accelerating offering hope to those grappling with the problems of proliferation and increasing costs. He agreed that there was still too much overlap with other discipline groups involved with publication and abstracting services. It was his belief that government support funds needed to sustain the national chemical information program would be unnecessary in seven or so years.(45)#

International - American Institute of Physics##In a meeting that included OST, BOB and the American Institute of Physics, William Koch, AIP's Director, stated that he would like to follow the footsteps of the American Chemical Society in the international arena by working through the Information Policy Group of the Organization for Economic Cooperation and Development. The philosophy of AIP was shifting from the exclusive support of the producers to the increased services for the consumers of chemical information. Like ACS's bid for continued government support, Koch implied that his organization would also require supportive funding during the early stages of services development.(44)##OST##One of the reasons why we were having difficulties in selling the notion of a single improved government-wide project-reporting system was because of the existence of the CASE II system which was being maintained as a separate reporting entity at NSF. The CASE system was confined to research grants to universities. All agencies that were making grants were expected to use the system. This meant that there were two competing project-reporting programs, one dealing with Federal agency R&D and the other with universities. FAA's W. Buril Barclay and the Department of Transportation's Secor D. Brown were two of the individuals who complained to OST about the requirement to input into the CASE II system, pointing out that it was a drain on their agency's resources, and the data provided would not give BOB and OST the kind of information that they required. In reporting this information to Dr. DuBridge, I also pointed out that it would be desirable for OST to get involved in the future with management information systems for government R&D. For some unknown reason, this area was not receiving any attention in OST and FCST. This implied that there were no problems among the agencies and that all agencies were using efficient R&D information management programs. This simply was not true, as any R&D manager would attest. If one of the purposes of FCST was to improve R&D processes, as well as to assure proper coordination, this area needed considerable attention. If Dr. DuBridge was interested in looking into this criticism, the information never got back to me, but I did recognize it as a sensitive area, one that the majority of the Federal R&D managers would like to keep private. It still appears to me to be a field that requires ventilation, if we are to improve overall Federal R&D management. The technique that we used in the OECD "confrontation" reviews would appear to be a good candidate for use in this area. (44)#
COSATI##Last year, Dr. Margaret Mead, the distinguished anthropologist passed away. This brought to mind her appearance before the COSATI Task Group on the Dissemination of Information early in l969 to discuss the problem of secrecy and dissemination in science and technology. She had just completed chairing a task group under AAAS on Science in the Promotion of Human Welfare. She stated that she preferred to "get a few things off her chest," rather than focusing on her task group's report. Here are a few of her comments:
##Scientists do not disseminate for two reasons: administrative problems and a desire to keep data out of the hands of associates, even those in the same organization. OST and COSATI should look into practices in the social science field. The Federal government should use the talents of social scientists more than it does. There is little evidence that pure research is hampered by secrecy, but does not like to see the Federal government, especially DOD, in this field despite the good work of ONR after World War II. We ought to listen harder to young people, even though they know no history, do not take the long view, are intoxicated with their new-found ability to frighten the establishment, and have no distinguishable program. We ought to accede to their wishes to curtail the research undertaken by DOD, however. She commented on the havoc that is caused when some people in research laboratories are cleared for classified projects while others are not. She also gave a few examples of work being done by DOD, CIA, AEC and others that, in her opinion, were contributing to alarm in the academic community.#
It was an experience to listen and interact with a person who had become a legend in her own day. On one issue, the audience did not appear to be in agreement with her view that one solution to solve the generation problem was to accede to the direction-less thrusts of the young rebels. That did not "sell."(45)#
#The reality of increasing budgets for Federal R&D was creating a secondary problem for the Clearinghouse for Federal STI. Not only was there an increase in the number of reports received from the Federal agencies, but orders for technical reports from users were increasing rapidly. The ceiling limit on the size of the CFSTI staff precluded the possibility of hiring more employees. The result was a slow-down of service to the CFSTI patrons. It also meant that the Government Printing Office was falling about three months behind in the delivery of NBS documents, thus bringing unhappiness to the Department of Commerce. Hubert Sauter, the Director of CFSTI, also complained that one of the DOD's information analysis centers, PLASTEC, had made an arrangement with CFSTI to sell its documents to compensate for the lack of funds. It was charging customers $15.50 for a document on polyurethane foams, for example, with most of the revenue going to PLASTEC. Sauter was afraid that arrangements of this type, if they became common, would further unsettle CFSTI. (47)#

(47) Aines, Andrew A., OST, Memorandum top Dr. Lee A. DuBridge, Subject: Highlights of the Week, June 7, l969, pp 5.

Congress##Senator Carl Montoya was nettled with the Nixon administration who he stated was giving "low priority to education and to library materials, services and construction by cutting $370 million out of the Office of Education budget, about 25% in the field of library services. Mr. Nixon made an eloquent statement about the importance of libraries to celebrate Library Week, then he proceeds to set our progress toward intellectual development back by virtually putting our libraries out of business."(47)

Representative Roman Pucinski, apparently reconciled to the pain of the failure of NSF to support him and his most recent bill, calling for a national information center, asked OST what he could do to help create a better environment for STI progress. I told him that OST was not contemplating the establishment of massive systems that would require a sizable apparatus, but was interested in helping specific communities in science, technology and education develop sensitive and efficient information services.(47)

In a discussion with Representative Emilio Daddario, it was disclosed that he did not favor the establishment of a permanent library commission, called for in HR 8839, although he continued to be interested in improved Federal STI programs. I found his stand on supporting the proposed Commission other than I expected.(47)

OST and COSATI

A barrage of complaints came into OST about the decision of NSF to stop funding the preparation of the Monthly Index of Russian Accessions by the Library of Congress. Our discussions with NSF and BOB revealed an unbudging determination to refrain from funding the publication. Here is another instance of what might have been a shortsighted policy, a failure to plan for the future.(47)

Another area where coordination was absent dealt with a sharp increase in the number of clearinghouses being set up at the direction of the President and Congress. The problem was that when these designations were made, there was no effort to discuss this with OST and COSATI. Examples of this failure are seen in a presidential directive prescribing the formation of a center for the development, collection, summarization and dissemination of information to help minority business enterprises. It was our view that such an operation could be tied to the Clearinghouse for Federal STI much more economically than organizing a new, stand-alone information operation. The President also directed the Department of Housing and Urban Development to establish a clearinghouse for information on government programs designed to foster voluntary action. The President stated that consideration should be given to having the private sector undertake this initiative. The problem with this was the high probability that HUD would also maintain an internal database on the subject or provide data for such a database to a private contractor, who would not have the entry to gather easily such information. (47)

A meeting took place between Jerry Wiesner and Carl Overhage of MIT, Harvey Brooks of Harvard, and Dr. DuBridge, aided by Dave Beckler, John Mays and Andrew A. Aines, on the concern of universities that the growth of government computer networks, based on the availability of excess or surplus computer time which GSA wanted government contractors to use, would result in a loss of university control over their own computer services. This was cited more of a future than current problem, but the inference was clear that at least these two prestigious universities were afraid that their central computer facilities would lose out and relief was needed.In addition to GSA's proposal were two more schemes. The Smithsonian Institution was interested in developing a regional center to provide local computer support to government agencies and contractors in the New England area. AEC also announced a plan to regionalize its computer efforts in the New England area. The matter was discussed with OMB and the other involved agencies, and what appeared to be a good idea to achieve economies was placed on hold.(47) Subsequently, a group from the Smithsonian Astrophysical Laboratory, Cambridge, Massachusetts told Aines at a meeting that they had submitted a proposal to GSA to operate a regional computer center. They acknowledged that Harvard and MIT might have difficulties with a regional center, but there were other universities in the area, naming Tufts, Northeastern, and Boston University, that would like to get cheaper computer time. Moreover, they saw no reason why Harvard and MIT should be forced into the use of the center. Some of the thrust of this group was blunted when they stated that they were ready to leave the Smithsonian Astrophysical Laboratory and form a company, the Phoenix Corporation, to operate such a center.(57)

Melvin S. Day, NASA, was asked to chair an OST meeting of representatives of Federal agencies which would be affected when the earth resource satellite program matured and became operational. The concern that we had dealt with their willingness to become part of the Landsat program and subsequently the intelligent and economical use of lLandsat data. Up to this point, the system developer in NASA had not carried on any discussion with the agencies that would be asked to scrap their older, more conventional information-gathering programs to take advantage of the satellite data acquisition program.(47)

Dr. Leonard Karel, National Library of Medicine, was made available to COSATI to assist it in organizing a meeting to feature a presentation by Dr. Robert Cairns, chairman of the NAS-NAE on the SATCOM report. His arrival was welcome, since the OST STI staff was so undermanned.(48)

Department of Defense

A meeting was held with Dr. Donald MacArthur, DOD, who informed me that he was not altogether pleased with the performance of his Director for Defense Technical Information. I reminded MacArthur of some remarks made at a meeting by the Assistant Secretary of Defense for Installations and Logistics that revealed a lack of cooperation in the technical information area between the Defense R&E and the I&E organizations. MacArthur stated that he would have his Director of Defense Technical Information study the problem of jurisdiction. Nothing really happened, an indication that the splendid program created by the first Defense Technical Information director, Walter Carlson, was beginning to unravel.(48)

International

Dr.Rudolph Bree, a Dutch national, who headed the EURATOM Center for Information and Documentation, visited OST to discuss the scientific and technical information programs of the Common Market nations. He made some interesting observations:

The Vienna-based International Atomic Energy Agency, which was in the process of establishing a worldwide atomic energy information system. This and other information organizations in Europe were being invaded by the Soviet Union with obvious intent to dominate them.

The Common Market was making an effort to get into the information mainstream in metallurgy and agriculture.

OECD was still a dominant force in the information policy area. It was not having the easiest time to work out "rules" for international information programs.

It was Bree's thesis that Europe was becoming more and more embroiled in technical information programs and that international politics were intervening with a vengeance. It was his view that the United States and all countries would have to pay more attention to information tactics and strategy in the future.(47)

At the request of OECD, Aines prepared a background paper for the Information Policy Group's Advisory Panel which, if adopted by that group, would result in the transformation of the IPG Economics Panel into the Panel on Management Information Systems. This was a direction urged by Aines, who pointed out to IPG that the management of governmental STI programs included far more than economics and that this was an area that all governments needed to focus their attention.(47)

The Soviet government continued to play games with the United States in our search for a return meeting with the Soviets in Moscow, which we had agreed upon earlier. The Soviets were not answering my letter which reminded them of this agreement. There was talk about a meeting that would focus on the standard reference data program, a subject in which they were interested. The NBS manager of the program was informed by them that they were now more interested in covering the larger field of science communications and information exchange.(48)

(48) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject Communications and Information Processing - Weekly Summary, June 28, 1969, pp 2.
The State Department was asked for support for the ICSU-UNESCO global STI project, UNISIST, by UNESCO. The State Department turned to OST and COSATI for advice. It apparently was clear that the Department of State was not paying attention to what was happening in this field, even though there was considerable publicity about the project, which was being lead by the NAS Foreign Policy Secretary, Dr. Harrison Brown. This information was passed on to Brown's office with a suggestion that the Department of State be briefed on what was happening. I tried to defuse the situation by informing the State Department that up to now there was only a feasibility study going on, and that it should get involved when there was an effort to create a permanent UNISIST. During my discussion with Brown's deputy, Edmund Rowan, he complained that the U.S. Mission to UNESCO lacked scientists, hence information was not flowing properly, but worse than this, U.S. interests were not being protected, even though the U.S. was paying about 30 percent of UNESCO's budget. (48) This little episode, when added to Rudolph Bree's assertion about the Soviet Union's aggressive effort to seek control or major influence in international organizations, is another indicator showing how amateur the efforts of the United States has been in protecting its interests on the international scene. The blame was not only attributable to the fumbling efforts of the Department of State, there was plenty more of it to be spread around in Congress and in BOB. There is more than a suspicion that the problem exists today, so many years later. Without a competent, full time STI expert in OSTP, who keeps his eyes on the international arena and knows how to orchestrate and coordinate effectively, we can expect little relief from the amateur approach that lets the Soviet Union run rings around us on the international STI scene.(48)

OST and COSATI

National Engineering Information Conference

One of the major information events of the year was a unique event, the OST-sponsored, international conference on engineering information. Cooperating sponsors were the Engineering Tripartite Committee and the National Science Foundation. Proceedings of the conference, which was held at the Department of State, were edited and prepared by Dr. Frank Y.Speight, who also participated in the planning of this event.(49)

(49) Speight, Frank Y., Engineers Joint Council for the Tripartite Committee, Proceedings of the National Engineering Information Conference, Washington, D.C, June 24-25, l969, 110 pages.

The planning for the meeting started many months earlier with the formation of an executive committee and a program committee, both chaired by William S. Hutchinson, Defense Supply Agency. About 300 guests from the United States, Canada, and several European countries attended. Dr. DuBridge made the welcoming address, Dr. Eric A. Walker, President of the National Academy of Sciences, made the keynote address, Congressman Emilio Q. Daddario (D.Conn) made the luncheon address. The conference chairman, Andrew A. Aines, addressed the attendees on the conference goals and ojectives and made the conference summation. In addition to the addresses, there were sessions on: Engineering Information Communication Problems, Government Information Programs and Systems, Private Sector Information Programs and Systems, International Programs and Systems, and Panel Discussions - An Evaluative Overview of Engineering Communications.

This was the first information exchange dealing with engineering information that brought together such a distinguished and heterogeneous group of engineers, scientists, information experts, government officials and others from both sides of the Atlantic Ocean. Although there was a persistent call at the meeting for follow-up engineering information conferences, the l969 conference was never repeated. A conference of this type can probably be successfully undertaken only under government auspices, but there has to be a group in government, at a high enough level, which is willing to do all of the work that is entailed.

Much was said at the conference by all of the speakers, but sifted from their remarks are a few worth recording.

Dr.Lee A. DuBridge:

 I feel almost as though I ought to be addressing the United Nations in this handsome room, the International Auditorium at the State Department...When I was a student, the only information device went under the code word "book" and it seemed that the book was an adequate means for exchanging information. I recall that by readingmaterial from our different physics journals each month, and occasionally a book or two which came out, I felt that I was well in touch with all the fields of physics that concerned me. As time went on, and the "Physical Review"
got fatter amd more frequent, and as more of the journals appeared, it gradually dawned on me, as it probably has on all of you, that the problem of exchanging information in a very large scientific and engineering population, to say nothing of the population of other areas, had become a major problem - indeed, this problem of information exchange had a science and technology all its own. I think we do not yet know how to use this technology adequately. I hope conferences such as this will give us some light on the question of whether it is possible to get information from the brain of one individual to brains of other individuals who need that information in an effective, comprehensive, understandable, and condensed way. There is a further requirement that this information be strained, filtered, abstracted, and possibly interpreted, so that it becomes as comprehensible to the recipient as it was presumably to the original donor, and this requirement is a problem to which I I really don't know whether there is an answer...These are problems that will be facing you. I expect that, as a result of this conference, I, myself, will see a few further gleams of light on these subjects. I am quite proud that my office was able to sponsor this conference, and I thank you all for being here.

Dr. Eric A. Walker:

We spend so much time and money on research - developing new information - that I am pleased so many of you are here today to discuss effective storage, retrieval and reuse of this engineering information. It is also our hope that this conference willl stimulate concern at policy- and decision-making levels of the country for the importance of information systems for all aspects of the engineering profession...When I went to work for General Electric Co. and I was told to begin designing distribution transformers. I was told that all the information that I needed was in the design books provided by the

department, and indeed it was- as long as I was going to stick to something that was pretty much of a routine matter. But I also remembver that a little later I was called upon to design an electrostatic precipitator, and the question came upas to whether we should make the wires negative or positive. This led to the investigation which took us further afield in the libraries, and finally we were asked the questions: "But what about ozone? Is it good for a person? Can people breathe it? If you want to get an education by searching for something in libraries, try to find any and all the information that has been written on the subject. You will learn eventually that there are about as many papers saying that ozone is good for a person as papers saying that ozone is harmful. This is a simple and minor problem to which an answer could have been provided rapidly, if we had the proper information gathering system at the time.

Dr. Walker then discussed the explosion of data in the engineering field, the failure of most engineers to view the handling of engineering information as an inseparable part of engineering itself, the need for better coordination within and between the public and private sectors. He concluded his remarks with a description of the recommendations of the SATCOM report, a joint product of the National Academy of Sciences and the National Academy of Engineering. He threw his support behind the major recommendation of SATCOM to establish a Joint Commission on Scientific and Technical Communication that would be responsible to the two academies. He concluded:

The effective transfer of information is, I believe, a basic engineering problem, and it puts engineers in a unique and favorable position to take the lead...(Our national scientific and technical information system) should be pluralistic, user-oriented, rapidly evolving under federal support - but with strong self-coordination to match the growing responsibilities of the private organizations.

Representative Emilio Q. Daddario:

As our nation stands on the threshold of the l970s, there is growing awareness of the criticality of information for decision-making. Modern man has access to much of the actual and interpretive wisdom of the ages, and modern information technology is allowing him to utilize these data tothe fullest extent. It is significant that this conference, with participation by eminent public and private sector respresentatives, should choose to focus upon existing information resources and developing information systems. It is unfortunate, however, that such a conference should have so little progress to discuss after a l0-year period of time. And this is in no way being critical, it is because of the complexities of the overall situation...While there have been many studies in the public and the private sector on the need for an improved national capability of handling vital information, no definitive action has been taken by those responsible for extablishing and sustaining such a resource. There are many in Congress who share my discomfort as we view the stenuous efforts undertaken by blue ribbon groups during the past decade - efforts which resulted in excellent thought-provoking reports but no implementing action.

He then traced some of the efforts of Congress in recent years to stimulate more action in the STI field, and then offered a number of recommendations:

There must be a responsible office close to the President, which has both the authority and the responsibility for bringing about a definite inmprovement in our national information handling capability. This office should be given adequate resources, personnel and money to perform its assigned tasks. A hand-picked professional staff should comprise this office, for the success of formulating, implementing and managing this sort of complex, long-term control and coordination effort will depend in large part upon the quality of leadership and operating personnel. This office must establish and maintain the closest possible rapport with the Congress, so that the planning, programming and budgeting determinations reflect as accurately as possible the needs of the nation and the thinking of both Executive and Legislative Branch leaders.

Daddario called for a strengthening of OST. He complained that COSATI did not have enough authority and resources to get its job done and that it "had to rely all too often on the ability of its staff to cajole and convince member agencies that they should cooperate."

Walter M. Carlson, IBM marketing consultant and the first director of the DOD technical information program, had a few sobering views. As he saw it, there was no justification for creating a new engineering information system because information technology is available to build it. There has to be evidence that the existing services are not working and that the development of a new system will result in identifiable and beneficial improvement in productivity or peerformance. Dr. J.C.R. Licklider, director of Project MAC at MIT, saw it differently, pointing out that the new generation of engineers is qualitatively different from the old and will not be satisfied with the present system. The older generation is playing with parameters; the younger will probably want to change the structure. Having been brought up on computers, unlike their elders, it is natural to assume that computers will the basis for future information systems.

Dr.Donald F. Katz, University of Chicago, saw the need for a different solution, the establishment of voluntary interdisciplionary committees operating under the aegis of technical and professional societies. He cited the example of a heat transfer group, comprised of members of eight societies. There are about 200 groups of this kind that could be formed to get the job done. How this would or could be done was not disclosed.

Unfortunately, the conditions described by Congressman Daddario were not improved along the lines he suggested.. OST was not given requisite staff resources. COSATI found itself intermitenttly under siege by the Bureau of the Budget, which persisted in growling about its size and scope while stubbornly refusing to take the time to learn more about the information problems and issues that Daddario and other members of Congress had encountered. If there were other positive results from the National Engineering Information Conference beyond information sharing, they were difficult to enumerate, let alone quantify. The views of Carlson, Licklider, and Katz were all seen as cogent, but limited in scope. But, all in all, we were aware that bringing the dispersed engineering information community together had to have a salutary effect. Also lavishly demonstrated was the difficulty of the various groups and factions of the engineering community to cooperate in the information area. We learned something about the way members of the Information Policy Group of OECD were responding to engineering information problems. We appreciated their praise for staging the national engineering information conference which, they stated, would be impossible to undertake in Europe during this era. There was one other gain, perhaps, convincing Dr. DuBridge that there were many problems, issues, and opportunities in the science communications area, as well as a large population "out there" deeply concerned with restructuring the STI systems of the country.

But Dr. DuBridge was experiencing his own problems, mostly with personnel shortages. The OST number two man, Deputy Director Ivan L. Bennett, Jr., the only medical doctor on the staff, had announced his departure. Dr. Bennett had been deeply interested in the development of biomedical information systems. Dr. Walter S. Baer, a young, solid-state physicist, who was most knowledgeable in communications and computer technology, had already left. One of the OST stalwarts, Dr. Nicholas E. Golovin, the resident expert on aeronautics and space, a splendid gentleman and colleague with an unusually fine mind, passed away leaving all of us shocked. Another OST oldtimer, Spurgeon M. Keeny, Jr., OST's national security affairs officer, who had been on the White House science staff since l957, left to become the assistant director of the U.S. Arms Control and Disarmament Agency. Daniel Margolies, a foreign service officer who was on leave to OST for five years, decided to retire. Margolies had always been interested in learning about international STI happenings. Finally, Dr. Charles V. Kidd, the executive secretary to the Federal Council for Science and Technology, Dr. DuBridge's expert expert in academic science and higher education, decided to resign. Chuck Kidd was particularly missed by those involved with science communications, because of the depth of his undersrtanding and his unflagging support. All of these departures came at a time when President Nixon had begun to involve his science advisor into virtually every national issue which had a scientific of technololgical component. In addition, a new cabinet-level council on the environment had been created and OST was asked to provide staff to assist this group. It was a difficult period for him,to say the least, but we all tried to help. (50)

(50) Agnello, Louis, Bureau Head, Washington News Bureau, Chemical and Engineering News, June 9, 1969, page 26.

One abiding memory I have of that period was of the forthcoming COSMOS voyage to the moon and NASA's plan to bring samples of the moon surface back to the United States. Excited by the prospect, I was moved to send a memorandum to Dr. DuBridge, suggesting what might be done with the moon "stuff. I wrote that aside from the scientific and analyses that would be undertaken, consideration might be given to:

1. Planning a White House ceremony with the astronauts making a presentation of a piece of the moon material
to the President, inviting heads of other countries and other dignitaries to attend.

2. Asking the President to visit the Congress with a piece of the moon stuff to be permanently displayed at a suitable congressional site.

3. Suggesting that the NASA director, Dr. Payne, with astronauts in attendance, bring a piece of the material to the United Nations in New York for the same treatment.

4. Asking the President to consider a display on the Ellipse, behind the White House, or on the mall near the Smithsonian Institution, and an invitation to NASA and other government personnel, to attend a ceremony there.

5. Suggest to Congress, through the President, that money be set aside for a building in Washington for the permanent

display of the moon samples.(51)

Obviously moved by the event, on another occasion, I suggested that consideration be given to changing the lighting system around the Ellipse, so that there would be a bright circle of light, clearly visible from the ground and from the air, that would commemorate what our astronauts had accomplished on their historic voyage to the moon. It would be gratifying to say that the suggestions touched off action along the lines suggested, but nothing really happened.(51)

(51) Aines, Andrew A.,OST, Memorandum to Dr. Lee A. DuBridge, OST Director, Subject: On Moon Stuff, June l0, 1969, one page.

Cross-Cutting Preview on Information Matters

One of the difficulties that plagued the leadership of OST was the existence of a number of programs in science and technology that had hazy boundaries, which resulted in overlapping jurisdiction within and outside of OST. To get a better grasp on some of these, OST's Executive Officer, David Z. Beckler, called on selected OST staff members for surveys within their areas of interest. I submitted a paper covering scientific communication, information processing and computers. Some of this material is shown below.(52)

(52) Aines, Andrew A., OST, Memorandum to David Z. Beckler, OST, Subject: Cross-Cutting Areas Preview - Information, July 1, 1969, pp 5. An identical memorandum was sent to the new OST Deputy Director, Dr. Hubert Heffner, July 22, 1969, for orientation purposes..

Here are a number of current and predicted trends based on nascent developments. Experimentation with networking and real-time systems will continue, but we will resist trying to make ours in governmental STI operational unless circumstances dictate. Congressional pressures will grow as their computer population grows. Congress will then demand more machine-readable input from the Executive Branch. These data will open Executive agency files to curious members and committees, precipitating quarreling over data needs and data control. Computer software, possibly also availability of files on information sciences and technology research will receive more attention. This may lead to more demand for technology transfer and utilization. We can expect to get continuing pressure in and out of government for modernization of libraries and other information centers, more computer support for educational institutions, and more training programs in the use of new methods and techniques of storing and handling information for scientists, engineers, educators,m students, and executives. More attention will go into work that will help protect the individual's privacy. There will be continued research to explore new horizons in scientific publication that may reduce costs and government subsidies. Groups in both the profit and not-for-profit information communities will seek more entry into the government information service field, using whatever political weapons they can find.

The reduction of R&D funding in some government agencies, together with continuing inflation, will result in worsening STI programs. Specifically being hurt: National Library of Medicine biomedical information systems, NSF's Office of Science Information Service programs, NBS's National Standard Reference Data System, NBS's Center for Computer Science and Technology, DOC's State Technical Services program, Computer Sciences and Engineering Board of the National Academy of Sciences, funding for symposia that involve information interchange.

Other areas of concern: We will want to push deeper into the work done by the COSATI Panel on Information Sciences Technology to exploit what it has been done. We should encourage information demonstration programs in such fields as: education, health, urban affairs, environmental quality, and others that involve socio-economic problems. Unless we keep the pressure on improving the Federal research project-reporting system, the agencies will slacken off in improving their own R&D management systems and practices. We will continue to have the CASE II project-reporting system that should be folded into the general project-reporting system to promote economy and duplicative reporting by the agencies. Steps need to be taken by NSF to reorganize and integrate its information and computing research programs. This was subsequently discussed with the NSF Director, Dr. William D. McElroy, who was asked to consider reorganizing his information and computer research programs under a new assistant director.(53) Despite the United States pre-eminence in the field of computers, there is an abysimal weakness in software R&D program development, thus opening an opportunity to other countries in Europe and Asia to gain footholds. DARPA should be given more protection in maintaining its programs. A very high priority for the United States is greatly improved computer and education and training programs in all sectors. The U.S. government needs to take a strong hand to get faster and better action. Finally, we should give considerably more attention to networks development so that the United States can build up an uncontestable global lead, especially in databases and networks for science and technology.

This document turned out to be an OST blueprint for STI leadership actions in the next few years. On reflection,a few of these goals were accomplished, but many still remain undone. I am convinced that much precious time has been lost in the interim at a high cost to American science and technology. (53)

(53) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, OST Director, Subject: A Few Highlights of the Week, July 3, l969, pp 2.

Goals for OST and COSATI

A "where are we" meeting was held with Eric Ward, the successor of Dr. Kidd as Executive Secretary, FCST. A talking paper was prepared, oulining goals and objectives: for the Science Adviser, for OST and for COSATI, recognizing that

there was overlap betweeen them.(54)

(54) Aines, Andrew A., OST. Talking Paper to be used to brief Dr. DuBride on goals and objectives for science communications an information processing, July 18, 1969, 1page.

For the Science Advisor, the goals are to provide pertinent information dealing with foreign and domestic trends, problems and issues, programs, developments and opportunities that he might want to pass on to the President and his staff. The information could be accompanied with specific recommendations to improve Federal, national and international science communications and, not incidently, to maintain leadersip in information and communication arts and sciences. Additionally, the science advisor might find it useful and opportunistic to push the notion of improved information and information processes leading to enhanced decision-making, problem-solving and mission accomplishment.

For OST, its goals are to participate with BOB and the Federal agencies in annual planning/programing/ budgeting reviews, using the stewardship review technique to obtain needed information; to interact with Congress in support of agency programs and joint development of databases and methods to exchange data; to provide leadership and support to public and private groups to improve national information processes across the board; to plan for and participate in internationl STI program development bilaterally and through OECD, ICSU, UNESCO and other international bodies; to develop or stimulate development elsewhere of standards, protocols and agreements needed to facilitate the handling and interchange of STI; seeking actions to improve general STI services to scientists and engineers.

For COSATI, its goals were to develop a government-wide coordinated, but decentralized STI system that would feature efficiency and cost effectiveness; to encourage actions leading to strengthened agency STI programs, better statistics through budget line items, more full time and qualified focal points in the agencies, and better education and training for STI workers and those they serve; and to take all actions needed to obtain the full cooperation of the private sector to improve current information programs and develop national STI systems plans and services for the future.

No disagreements were voiced about the general tenor of these goals and objectives, but it became obvious that the new FCST Executive Secretary lacked the depth, the understanding, and the knowledge of his predecessor. On the positive side, the new Deputy Director, Dr. Heffner, began to show more interest in the STI program. Faced with a request to attend a BOB meeting called to explore steps needed to strengthen the Federal statistical program, he asked for Aines' views on the subject (55)

(55) Mayo, Robert P, Director, Memorandum for Heads of Executive Departments and Establishments, Subject: Steps to Strengthen the Federal Statisical Program, June 25, 1969, 1 page. Dr. Heffner attended the meeting in lieu of Dr. DuBridge.

The Mayo memorandum announced a change of name of the BOB statistical unit to the Office of Statistical Policy. The purpose of this office will be to develop unified Federal statistical programs and to review agency budgets for statistical activities. The new office will chair a new group, the Interagency Committee on Statistical Programs and Policy.

Aines prepared a brief "talking paper" for Heffner's use, a paper which stressed the need for much better statistical data and the need to eliminate statistical programs that had become, over time, irrelevant and ritualistic. There are requests for statistical data from various organizations like OECD that we were unable to satisfy. We are unable to get complete and accurate STI budget data from the Federal agencies even with the help of NSF. We lack statistics on the implementation of some 5,000 treaties and agreements on the exchange of technical information with other countries, simply because no mechanism had ever been devised to gather the data dealing with implementation or non-implementation. There were other areas, such as developing national STI systems, where data and statistics were mandatory and we would need the help of BOB to obtain them. It would be useful to the OST STI group if Dr. Heffner would include our requests for help, if he found it appropriate at the meeting, or thereafter in an OST-BOB dialog.(56)

(56) Aines, Andrew A., OST, Memorandum to Dr. Hubert Heffner, OST Deputy Director, Subject: Talking Paper on Meeting for Federal Statistical Programs, July 22, 1969, pp
2

A decision was made by COSATI to provide the SATCOM leadership with an opportunity to disseminate their study findings to as broad an audience as could be assembled in the Washington, D.C. area. The meeting took place at Smithsonian Institution auditorium on July l9, l969 before a full audience, numbering 230 people. Formal presentations were made by the SATCOM chairman and Executive Director, Drs. Robert W.Cairns and F. Joachim Weyl. Dr. Cairns expressed his appreciation for the presence of such a large audience. Other presentations were made by representatives of government, industry, universities, and professional societies. In general, the report received favorable treatment, but there were a few criticisms voiced about the direction of some of the recommendations. From the COSATI standpoint, there were a number of concerns, some expressed publicly and others privately, but it was felt that the NAS-NAE effort was worthwhile, although over-long, and the academies were deserving of praise.(57)

(57) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director OST, Subject: Activities Report, July 26, 1969. pp 5.

Information and R&D

In response to a request from Dr. Heffner to examine Federal information and R&D at a moment in time when science support on the part of the people and their respresentatives in the Congress appeared to be waning, I responded along these lines.

There is another form of information dissemination that Federal R&D managers ought to worry more about, the explanation to the public of their accomplishments and lack of accomplishments, even though the latter is a fact of life in any research program, a reality that will not frighten the citizen. It is not often that we can have successful demonstrations like the NASA Apollo series that speak for themselves, so it behooves science managers to make sure that their less than spectacular results get requisite attention. By logic I find unacceptable, too many managers have taken the annual inflow of funds to continue their programs as sufficient evidence of the value of their work. Much of their time is spent in preparing their budget requests for the next budget round, and insufficient time and effort is devoted to explaining progress and justifying negative results. I am negatively impressed by those Federal agencies which have shown little interest in improving internal handling of research project programs in their own agenciesi and sharing project information with other agencies. This failure has been sustantiated in the Peat, Marwick and Livingston study. The Science Advisor and the BOB director would be wise to inform the Federal R&D managers and their bench workers that they must show evidence, even certify, that they have consulted current Federal R&D project lists before undertaking new R&D projects. Some agencies have not yet responded to Dr. DuBridge's letter asking for their comments on the PML report, in itself an indication of their lack of interest.It all boils down to a need of information discipline and this, unfortunately was and remains in short supply in the Federal R&D community.(58)

(58) Aines, Andrew A., OST, Memorandum to Dr. Hubert Heffner, Deputy Director, OST, Subject: Congress, Research and Budgets, July 24, 1969, pp 2. .

DOD

The DOD STI management continued to be a problem. My anxiety was magnified by the recognition that the DOD STI program had been the largest and the best in the government during the early l960s. It was the model for the other agencies to emulate. It was the "competition" that stimulated the other agencies to strengthen their own STI programs. The incumbent Director, to be fair to him, did not have the support and authority of his predecessor, Walter Carlson. Nevertheless, there were commitments to improve that were made at the last stewardship review of that agency. Little had been done to implement the DOD Raymond Study findings, made a few years earlier. Some of these involved service charges, microfiche dissemination, reponding to the PML report on project-reporting, Air Force treatment of STI officers, weakness of service focal points, lagging DOD-wide STI services, nanagement improvements in DOD information analysis centers, release of data and freedom of information problems, coordination needs within DOD with the logistics and the intelligence sectors, and better support for COSATI and its programs. Christensen complained about the lack of support for his program within DOD.(57)

Merger of SSIE and CFSTI

Although BOB saw the value of combining these two functions under one roof, Joseph English of BOB admitted that it was a difficult task because of the lack of spaces for CFSTI. The personnel of SIE were not in the civil service, and shifting a block of about 75 tenured people on to government personnel rolls was difficult to accomplish. The problem was never solved, sad to admit.(57)

Problems Within the Toxicological Program

For some reason that was never clarified, Dr. Charles Rice, Director of the NLM Toxicological Program was having difficulties in getting his program started. Rice had not had government experience prior to taking over the post, and this may have contributed to his problems. Several suggestions were made to him by Aines in a meeting requested by Rice, including that he learn as much as he could about the National Standard Reference Data program and how it operated. It was also suggested to him that he keep his eyes on the emerging environmental data program that were beginning to appear. (57) In a subsequent discussion with Dr. Martin Cummings, NLM Director, he recognized that there were some financial

problems that he would solve. He also promised to strengthen the leadership of the Toxicological Information Program.(61)

A small group of agency people, including David Hersey (SSIE), Clifford Johnson (NIH), and Edward Todd (NSF), were assembled at OST to study the problem of misleading titles of research projects. A letter from Jack Young, BOB, stimulated this action. Critics of governmental research programs, mostly in Congress, were pouncing on individual projects whose titles were less than descriptive of the objectives of the intended research and holding them up for public derision as frivolous or a waste of taxpayers' funds. Dr. Hersey agreed to chair a small group to determine what might be done about this annoying practice that was upsetting to R&D managers, scientists and engineers in and out of the government. One assessment was that there would be some relief if researchers were more careful in the preparation of titles of their research projects, but expectation that the critics would curtail their periodic attacks even if this was done was naive.Damage control at the source was the best that could be expected. (57) Periodically, new critics, who like to use this tactic, appear. Senator Proxmire, Senator Mansfield, and Representative Aspin are three members of Congress who are identified with this practice at one time or another in their careers. Obviously, they are most successful in using this device when the media are cooperative.

Computers in Higher Education - Oates Panel

The NAS-formed Panel on Computers in Higher Education met at Woods Hole to explore actions needed to advance the use of computing machinery in higher education. About 40 people were in attendance. (59)

(59) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Computers in Higher Education Over the Coming Decade: A Report of the NAS Woods Hole Conference, July 24-28, 1969, 10 pages plus appendices.

Prior to the meeting, the attendees received a document, entitled: " Oates Panel Working Document No. 1; A Basis for Discussions." It stated that the conference was stimulated by three perceived mismatches: the expected (or feared) contributions of computers and associated technologies to the national welfare; the type of computer traiing and education offered by or expected of institutions of higher learning; and the allocation and management of people and resources devoted to training and education. The document suggested five hypotheses to give scope and direction: that computers are a key element of our national security; that the computer industry is a key contributor towards a favorable balance of trade; that the computer is a key to productivity increases in our economy in operating and service sectors, including education; that computers are transforming all business practice ranging from the lowest clerical task to the most complex decision-making processes; and that computers are revolutionizing the natural and social sciences through new conceptual tools that will amplify our intellectual powers more than did the invention of writing. To capture the flavor of the panel's and observer's contributions, here are a few selected inputs:

Philip Handler, (President, National Academy of Sciences):

This is a strange moment in history. Even with one-third of the world`s GNP, it s getting harder and harder to do the things we want or need to do. In the earlier Pierce Report, the point was made of the need for a lot of funds; today we are falling further behind. Most major decisions are made in the public , not private sector today. The recently issued Leonard Garment report on national goals also notes the lack of resource. The computyer as a tool for the young may be revolutionary.

Harvey Brooks, (Dean, Division of Engineering and Applied Physics,Harvard University)

Think of what computers have done in the 15 years and what they will do in the next 15. The cvurrent climate is against more funds for defense and intelligence. The serious problem of productivity is a tough nut to crack. Education calls for creative development by smart people to be executed by stupid people. It is still a big cottage industry. Almost every university in the United Kingdom is setting up an office to work with government, particularly in the computer area. He disagreed with those who want to keep the military out of universities, but agrees that there is room for useful changes.

William Lurie (General Manager, General Electric Co.)

Most foreign governments want and need computer development in all fields; security, industry and education. They complain that imports of computers from the United States hurts their trade balance, and they would prefer to export them. They fear U.S.-controlled subsidiaries. Politically, European countries must make an effort to get into the computer swim. They want local computer R&D. Japan where IBM is a small factor is now second to the U., but Japan has 90 percent of the

radio business in the U.S.A., about 50 percent of the TV sets, 85 percent of the tape recorders, and 50 percent of the stereo consoles. Japan has taken over consumer electronics fronm the U.S.A.

John Pierce (Executive Director, Research Communications Sciences Division, Bell Laboratories)

The economics involved in getting com;uters into greater use in education is a powerful problem. Can do revelutionary work with the computer in subject fields, yet they are in their infancy. Styudents can do powerful things with them iin mathematics, modeling, learning about technology, and learning fast. The general purpose computer is vanishingas special purpose machines take over. Commercial time-sharing is also in. The best work in computers today comes from the person who uses it to solve his problems rather than the computernik (computer professionals). We should avoid any fixation on supporting computers only in the colleges. The computer will inocculate people from ignorance and fear. I advocate government sharing of costs of computers in universities, but better leadership is needed in schools. Enterprise can overcome the lack of funds. I prefer renting from service bureaus over purchasing. I advocate provision of surplus government time. I am not in favor of having large computers in key universities and doling out time to smaller ones.

There were a number of other comments that are interesting in light of what has transpired since l969. A few are provided below.

William Miller, vice-president for research, Stanford University observed that he was not confident that U.S. companies will be able to respond to the Japanese threat, although he saw great gains in productivity in banks and financial institutions as a result of computer use. Hugh Donaghue, assistant to the president, Control Data Corporation, foresaw that computers would be faster, cost of computing cheaper, and computer memories would expand, as would time-sharing. CATV, will have revolutionary growth, CATV franchises would be offered by cities, and CATV will become a two-way distributive system. Digital transmission will be aided by wide band use. Cheap terminals are in sight. Costly buffers will be less needed. The number of wired campuses will increase, as will snmall console query systems and consumer home-computing. Daniel Alpert, Dean of the Graduate College, University of Illinois, predicted that the computer will provide hope for the endangered university, as he traced the history ofthe PLATO program which at that time was in existence for 11 years. Most universities are experiencing financial deficits to keep their computer operations going. Apart fron the Federal government, there is a great decline in productivity in other governmental components. Fragmentation among government entities is reflected in universities, but computers can have a significant role in overcoming this problem. A global approach is needed to make the whole apparatus more effective. The presence of the computer and the development of a common language helps keep the walls between the disciplines low enough to get intercommunication. Thoughtful exploratory comments were also made by Ithiel de Sola Pool (MIT), William T. Knox (McGraw Hill), John Meyer (President, National Bureau of Economic Research) and others.(59)

Except for a few missed predictions, here and there, it is amazing how well the panelists and other participants at the Woods Hole conference predicted the shape of things to come.

National Data Program for the Marine Environment

One of the major-and undoubtedly long forgotten-studies that marked the late l960s, was the marine data study undertaken by the System Development Corporation for the National Council for the Marine Environment.(60)

(60) Schneidewind, Norman (Director) et al, System Development Corporation, Santa Monica, California, National Data Program for the Marine Environment, Final Report, Two Volumes. This report was undertaken for the National Council on Marine Resources and Engineering Development under Office of Naval Research contract No. N00014-667-C-0559. Vol. I (National Data Program for the Marine Environment) and Vol. II (Technical Development Plan for the Marine Environment), July 31, 1969, 511 pages.

This large and costly study was not only the product of SDC systems experts, it also bore the imprimatur of the Scripps Advisory Panel, headed by Dr. William A Nierenberg. It was so large and so complex an effort that it required the additional services of three subcontractors: Bissett-Berman Corporation, Dillinghan Corporation, and Isotopes, Inc. The work can be traced back to an enabling law - the Marine Resources and Engineering Development Act of 1966 (PL 89-454) that called on the President to develop a comprehensive, long-range, and coordinated national program in marine science with the assistance of a National Council on Marine Resources and Engineering Development and an advisory Commission on Marine Science, Engineering and Resources. The National Council was composed of the Vice-President, five members of the President's Cabinet, and three heads of other Federal agencies. Specifically, the law required the Marine Council to advise the President in policy-planning and the coordination of marine science affairs.

The marine science effort, which embraced a variety of scientific and engineering disciplines and technologies, involving a wide group of engineering disciplines and technologies, had a large constituency in Congress, in the Executive Branch, in major U.S.industries, and numerous groups in cities, states, and international organizations.

Federal support for marine R&D was a rapidly growing sector in the Federal R&D budget, actually the fastest growing in the FY 1970 budget, up fron $438 million in 1967 to $528 million in l970. In January l969, the Marine Sciences Commission recommended $8 billion for civil-oriented marine sciences activities for the next data. It was foreseen that data for research and management of marine R&D and other marine activities was going to be a key resource that would require development. Vast quantities of data would be needed in these categories;

Environmental data, realtime and archival, concerning the nature of the oceans and the interactions of man's activities with the marine environment.

Bibliographic and documentation information.

Program management and budget information about past, present and projected activities, and

Statisical, economic and demographic information concerning man's activities that impinge on or are affected by marine operations. .

The number of recommendations contained in the final report precludes more than a brief coverage of a few of them:

Authorize prompt implementation of the Technical Development Plan (contains 15 specific recommendations).

Establish a permanent mechanism for Federal coordination of marine data management.

Establish a permanent mechanism for Federal coordination of marine data manmagement.

Substantially increase the authority and responsibility assigned to the existing national data centers.

Designate a national ocean engineering data referral center.

Develop and maintain a comprehensive inventory of marine data holdings, samples, products and publications.

The total cost of implementing all of the recommendations over a ten-year period would be a cool $8 billion. The study team also estimated the costs of implementing various parts of their recommendations. The team also pointed out that their recommendations only covered Federal nondefense programs. What the defense-related costs would be were not shown. Obviously, there was no likelihood of mounting the marine data program. Funds could not be designated for such a program, regardless of merits. However, the systems approach taken and the product generated by the study team deserve to be carefully studied by any individual or group in the public or private sector interested in considering or planning an extremely large scientific and technical information plan.

Information System for the Environment

The ferment for problem-solving information systems was a stimulant in private sector circles. A retired Air Force general, Ray A. Dunn, approached John Buckley, the scientist who was charged with environmental protection matters in OST with an unsolicited proposal to study the establishment of an environmental data bank. In a meeting with Dunn, he explained that he was an environmental quality buff, but he recognized the need for environmental quality information system development, hence he asked the Computer Planning Corporation to prepare a proposal for such a database. The proposal was considered inadequate by OST, but it was made clear that this was because those that prepared it were not as knowledgeable in database development as would be required, but the idea of a database was considered meritorious.(57)

National Network for the Exchange and Transfer of Techn ology

In addition to the recommendation for an environmental quality information program, there was a call for the establishment of a national network for the exchange and transfer of technology. This was the subject of an Airlie House seminar that lasted two days. Speakers from the public and the private sectors addressed the subject. Hearings on Capitol Hill were being held by Senator McClellan. I addressed the group on the subject "What do People Mean by National Information Systems."

In this talk, I argued against the notion of a costly, dedicated information system for the exchange of and transfer of technology, pointing out that many of the current and planned information systems already contain or would contain information that pertains to technical transfer. Consideration might be given to an information analysis center for technology utilization at this time. but going beyond this would probably be politically and economically unwise.(61)

International

Sarah Thomas, University of Maryland, who was selected to spend a year assisting the Israeli government in the development of library and information programs, recommended that OST meet with Carl Keren, Israeli National Research and Development Council, a distinguished information scientist, who was charged with the scientific and technical information program of that country. Keren was largely interested in determining what percent of the total Israeli R&D budget should be spent for scientific and technical communications. It was explained to him that we had no specific figure that would mean anything because each country was different, but our guess was that it would be between 5 and 10 percent, depending on the size of the national R&D program.(57)

At the suggestion of Scott Adams, Deputy Director, National Library of Medicine, a meeting was held with Adam Wysocki, a Polish national, who was then working with UNESCO in developing its information program. Wysocki asked that the United States throw its support behind the ICSU-Unesco UNISIST program for a global STI system. Dr. Wysocki was informed that as a matter of policy, the United States advocated open and full international sharing of STI, hence it would be interested in the future of the UNISIST program. (57)

On more than one occasion in this book, I have written about the lackadaisical attitude taken by the U.S. government in implementing its scientific exchange treaties and agreements with other countries. Obviously, agreements of this nature are made between other countries. For example, in mid-1969, the British and the Soviet Union consummated a scientific and technological information exchange agreement. It so happened that this was announced at the same time a statement by a British prime minister was released. The gist of the Anglo-Soviet agreement was that there would be the exchange of specialist delegations and technical information, including interchange of licenses, patents and other technical know-how. The agreement also called for the formation of new joint working groups in a number of fields including information storage and retrieval. Lecturers and , joint symposia would be employed regularly to exchange information on organization problems of science and technology. Also reported in the Washington Post (November 14, 1969) in an article entitled: "Wilson Hits U.S. Takeover," the Prime Minister is quoted as urging the Common Market countries to join Britain in creating "a vast and powerful European technology to halt a U.S. takeover of Europe's indstry." He called for the establishment of an institute of technology and bilateral industrial projects with European partners that would deal with computers, electronics, nuclear energy, and other high technology projects.(61) Since the U.K. was receiving a considerable amount of high-tech STI, and since the British prime minister appeared to be disenchanted with the United States, there was at least a fleeting concern that some of the technical information generated in the U.S. and shared with the British might find its way to the Soviet Union. The thought was dismissed, since it was believed that the British government probably would be no more diligent than the United States in sharing technical information with other countries with which it consummated treaties or agreements to exchange STI.

(61) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Activities of the Week, August 2, 1969, pp 4.

One of the areas that I tried to get the Information Policy Group of OECD more interested in was in information analysis centers. I pointed out to IPG in the past that the information analysis center effort was growing in the United States, that the U.S. government was supporting about 115 of these in the public and private facilities and that there were probably a hundred more that could be so labeled. After a couple of tries to build up interest, IPG expressed its interest in learning more, Dr. Edward Brady, NBS, who was very knowledgeable about the centers consented to prepare a background paper so that the subject could be discussed. Even though the IPG members were anxious to learn more about them, not much really happened. Subsequently, I concluded that the major interest of the majority of the IPG group was less on research and development, less on the total spectrum of STI, and more on dissemination and the management of dissemination efforts. The relatively secret kind of R&D and information environment that flourished in Europe at that time was not receptive to information analysis center growth and if screened and critical data flowed in Europe, it did so through private channels. (64)

COSATI and OST

DOD - ARPA

A meeting was held with Dr. S.J. Lukasik, Deputy Director of ARPA on the subject of an observer for COSATI. Robert Taylor, who had so much to do with the development of the ARPANET was leaving and Dr. Lukasik wanted to nominate Larry Roberts of the ARPA staff. Dr. Roberts was also one of the pioneers of the ARPANET, and a splendid replacement. Lukasis discussed ARPA's study to trace the flow and utilization of knowledge in connection with Project Hindsight. We talked about the desirability of creating a data base for the behavioral sciences. I advised against such a move because of the excessive amount of work and cost that would be entailed, suggesting instead a project on the dynamics of organizing data stores that might include applicable behavioral science information as one of the experimental files. This we agreed might be a better way to start.(61)

Interaction with ARPA during the 1960s was always useful and reasonably pleasurable, although it was difficult to get them directly into science communications research and development.

On Trying to Prove the Value of STI

We were fully aware that one of the basic problems faced by OST, COSATI and all of the Federal STI managers was our inability to prove with strong evidence the value of STI. This was a matter that gave us considerable concern. For several years, I had encouraged the members of COSATI to keep a log on all of their agency R&D programs in hope of isolating the significant evidence that would dramatically prove the value of their STI programs. They were urged to work closely with their bench scientists and engineers to make the search for the elusive information less challenging. When a letter calling for a study of this subject arrived from Gus.S. Simpson, Jr., a highly respected information scientist at Battelle Memorial, it precipitated a vigorous internal discussion with Steve Rossmassler and Bob Landau participating. Simpson's letter recommended a two-year study estimated to cost $250,000, to be sponsored by NSF. DOD, AEC, NASA, DHEW, DOC, or the Office of Education. Simpson wrote: "The objective is to demonstrate the value of STI through the use of positive examples of advances achieved through the use of STI.

(62) Simpson, Gus S. Simpson, Jr., Battelle Memorial,Columbus, Ohio, Letter to Andrew A.Aines, OST, August 19, 1969, one page.

Rossmassler related his experience in the National Bureau of Standards, seeking to obtain value-derived information resulting from the standard reference data program . He wrote:

We came up with four or five reasonably good specific examples, but we found it very hard to quantify the help which STI gives to R&D. The reason, I suspect, is that the entire information acquisition and utilization process, as it applies to a specific research or development working day, is not separable from the rest. It is accepted by the man doing the work as a normal part of the normal effort. He reads, he thinks, he plans an experiment. He searches the literature. He talks to a colleague. Information flows in and out of his consciousness. He performs an experiment or makes a test, or sketches out a possible design configuration. All the while information flows in and out. Suddenly (or gradually), a step of progress is achieved. The achievement is not solely attributable to any one prior act. It came about as a result of focusing all his capabilities on the job at hand. If, as sometimes happens, a single inspiration or insight can be defined, that cause must still be attributed to the gestalt of man + situation + background information. And the scientist and engineer is very reluctant to deny his own initiative or logical contribution. I would not therefore be hopeful of very great success from such a study.(63)

Robert Landau took a different tack. He wrote:

I agree that the study would be helpful; hoever, the ocus of my reaction is on the retrieval of facts or data problem rather than the integrative creative process. If such a study were to be made, I would rather have emphasis on the measures of success that might be identified in terms of the retrieval process rather than the satisfaction of the integrative creative process. But I would agree with Steve that I would not be hopeful of a very great success for such a study.(63)

The study was not undertaken by any of the candidate agencies, nor did we encourage that it be done. My attitude was that Rossmassler was correct in his belief that scientists and engineers were reluctant to give credit to outside information, per se, for their research accomplishment. Until they were, the kind of project suggested by Simpson would probably draw negative or inconclusive results. But even while saying this, I can remember the comment made by Dr. Alvin Weinberg about the work of Dr. Katherine Way, who operated an information analysis center at the National Oak Ridge Laboratory. It was his view that she had not only contributed in terms of information service to others, but had also had been able to contribute to the creation of new knowledge. This was one reason that he had learned to admire top level information experts. Granted that this is a different kind of a contribution than was considered by Simpson, nevertheless, it is an area that needs more development in the brave new information world of the future.

(63) Rossmassler, Stephen, OST,and Landau, Robert, OST, Internal Memoranda: Comments on Gus Simpson's letter of August 19, 1969, pp 6.

(64) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director OST, Subject: Scanning the Information Scene, August 9, 1969, pp 3.

(65) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director OST, Weekly Progress Report, August 16, 1969, pp 4.

International

The Director of OST, Dr. DuBridge, decided to follow up on signals received from the President about the importance of international relations, by preparing for a trip to Europe. Before he departed, he asked his staff for status reports dealing with their individual areas of interest. Obviously, with all of the STI staff's involvement with international affairs, it was necessary that Dr. DuBridge be well-armed with an STI status report.

(66) Aines, Andrew A., OST, Memorandum to Dr. Lee A. DuBridge, Director, OST, Subject: Notes on Science Communication for European Trip, August l4, 1069, pp 5.

A few excerpts of the material provided Dr. DuBridge follow:

A strong effort is going on in Europe to modernize science communications. Governments have become, as in the U.S., much more involved with science and technology. Most countries have established STI programs and focal points. International organizations, like OECD, Council of Europe, NATO, ICSU-UNESCO, COMECON, have also created STI programs. Regional groups, such as SCANDOC, formed by the Scandinavian countries, are visible and active. Though dwarfed by governmental programs, professional societies are active in this field. Exchange of machine-readable materials is on the increase. European countries are probably more diligent in obtaining U.S. information than we are in gathering theirs. They appreciate the relatively free flow of STI from the United States, hence keep a close contact with announcements of U.S. generated scientific and technical reports. The U.S. government does not support a similarly aggressive program to acquire knowledge, at least formally. The efforts of our intelligence organs to acquire technical information is discounted as weak, comparatively. While there are inherent values in cooperative STI programs that the Europeans accept, there is still a well defined tendency on the part of individual countries to protect their own independent STI programs. The technical press that is flourishing in the United States is not as conspicuous in Europe, even though that continent has an excellent publishing industry. OST has been aggressively active in OECD's information programs: the Information Policy Group and the Computer Utilization Group. The National Library of Medicine, with our encouragement, has been working with a number of countries in the internationalization of the MEDLARS program. Excellent progress has been made. NASA is deeply involved in an international information sharing program with a number of contacts. Through the International Nuclear Energy Agency in Vienna, AEC has been participating in an international nuclear energy sharing program that is also making progress. Our Department of Agriculture has made contacts with various information groups and programs through OECD, the Common Market, and FAO. As the OST nominee, Dr. Lewis Branscomb is representing the U.S. in the OECD Secretary-General's STI ad hoc advisory group program (The Piganiol Panel), which is looking at the "bigger information picture. "We have thrown our support behind the ICSU-UNESCO UNISIST global STI program. Harrison Brown, NAS's Foreign Secretary, and NSF's Burton Adkinson are key performers in this program.

The memorandum concluded with a list of objectives of what OST should seek to accomplish internationally. The carefully crafted document was probably useful to the Science Advisor, assuming that anything came up on science communications during his trip, but, truth to tell, this was not reported when he returned.(66)

The OST staff person mostly directly involved with international matters, other than information, was Dr. Norman Neureiter, then a newcomer to OST. At his request, Aines prepared a paper suggesting the study of the feasibility of The Inter-Government Center for Promotion of Scientific and Technical Coomunication as an AID project. The purpose of such an organization would be to advance scientific and technical communication in the Western Hemisphere by means of a two-pronged program: (1) to help Latin Americans with requisite STI training and (2) to provide a resident staff in the Center to make studies of the specific needs of each participating country, studies that would be transmitted by AID to each of the Latin American countries participating in the program.(65)

At the request to a letter from J. Commissaire, the president for postgraduate education of the National Council of French

Engineers, materials were sent him about the use of television in the United States for the post-graduate education of engineers. Another letter was sent to Dr. Philip Hemily, U.S. Mission to OECD, about public data bases, a matter then being explored in OECD. We selected Earl Houseman, USDA, to attend the OECD computer Panel meeting. Houseman is an expert in data processing and statistics, the kind of skills that OECD was interested in.(64) Dr. Lewis Branscomb also agreed to discuss the merits of a proposal for a European Standards Operation at a meeting held by ECE in Europe during the time he was meeting with the Piganiol Panel.(65)

OST and COSATI

One of the COSATI member agencies was the Department of Housing and Urban Development (HUD). Insofar as its involvement with COSATI was concerned, HUD was considered by the other COSATI members as under-organized and relatively ineffective. This resulted in a meeting with a new HUD Assistant for Research, Harry Finger, who had been in NASA for a numbe